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CHILDREN GAINED 4.84 times as fast on MEAD'S CEREAL

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SIMPLY by the addition of 4 ounces of Mead's Cereal to their daily diet, a group of 10 children studied by Summerfeldt[1] gained at 4.84 times the rate of a control group fed on ordinary cereal. Yet when the first group were fed ordinary cereals they gained at only 1.17 times the expected rate.

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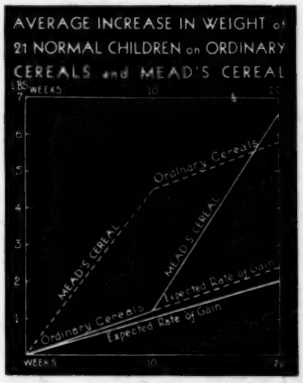
[1]Summerfeldt, P.: *Am. J. Dis. Child.* **43**:285-290; Feb. 1932.



The striking feature was that the rate of gain of the two groups of children increased or dropped in ratio to the amount of Mead's Cereal in their diet.[1]

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MINNESOTA MEDICINE

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VOL. XV APRIL, 1932 No. 4

FOLLOWING UP SANATORIUM PATIENTS*

GEORGE THOMAS PALMER, M.D.
Springfield, Illinois

REGARDLESS of the brilliant progress in tuberculosis work as shown by the decrease in tuberculosis mortality, one who has followed the anti-tuberculosis campaign closely for a quarter of a century is still rather depressed by three outstanding facts: (a) the continued delay in diagnosis until an advanced and incurable stage of the disease has been reached; (b) delay in seeking sanatorium care until the chances of recovery or material improvement are slight; (c) the excessive rate of reactivation among patients who have been discharged or who have left sanatoria in apparently good condition.

The evidence that we have by no means reached the place we should strive to attain in educational and clinical service leading to early diagnosis, is apparent to every physician and nurse engaged in tuberculosis work and especially to those connected with sanatoria. Despite our educational efforts, the public, and even those who are in daily contact with open cases of tuberculosis, are not yet convinced of the importance of periodic re-examination. So far, we have failed to sufficiently interest the medical profession to the point where we have any assurance that an examination will lead to a diagnosis of active or well advanced disease.

Neither the doctor nor the layman has been impressed with the value and economy, both in human life and money, of early sanatorium care, nor with the usual futility of home care.

At any rate, in this day of self-congratulation and advancement, we still witness the doleful procession of advanced consumptives entering our sanatoria. It is still not unusual to have death occur within a few weeks after sanatorium care is sought or even in the interim between application for admission and the finding of a vacancy. In our own institution, it is still necessary to maintain 60 per cent of our beds as infirmary or hospital beds and 40 per cent as ambulant or semi-ambulant beds.

This gloomy spectacle of failure to secure diagnosis and sanatorium care until death is near at hand, may not be so frequent or conspicuous in certain fortunate and favored localities in the Mississippi Valley where great public interest has been aroused and where unusual public machinery has been created; but, in my own State, at least, these exceptionally favored spots are very few and far between. However, that is not the question that I propose to discuss today.

Someone has said that of curable consumptives, seventy-five per cent lose their chance of recovery after the symptoms of the disease have practically disappeared. The outstanding discouragement of my own twenty years of sanatorium management, is not failure to attain improvement or arrest while the patient is in the institution, but the unnecessarily high percentage of reactivation—the excessive morbidity and mortality—within a few years after leaving the sanatorium.

What I have to say of our efforts to overcome or to prevent this reactivation will not be especially interesting to those who are located in communities where there are ideally operated municipal or county sanatoria with entirely adequate dispensary and visiting nurse service (if there are such comunimties); but our problem is not unlike that of the state sanatoria or others serving a wide area of territory, without competent visiting nurses or other field staff.

The excessive percentage of reactivation and high mortality rate among those who are discharged from sanatoria in good condition may

*Presented before the Mississippi Valley Conference on Tuberculosis, St. Paul, Minnesota, September 21, 22, and 23, 1931.

be due to faulty sanatorium education and training, but is more likely due to improper guidance on reaching home, to failure to obtain the cooperation and moral support of the family, and to the restlessness and sense of irresponsibility on the part of the patient. It consequently appears that the most effective course which the sanatorium can follow to assure permanency of its results, is that which will give the greatest influence over the patient while in the institution and that which gives the patient the greatest degree of support and supervision following his discharge.

In our own sanatorium the foundation for the follow-up or home control of the patient is begun the day he enters the sanatorium. Inasmuch as the later home contact is a job which I have assigned to myself, and which must be the work of one man, I invariably take the patient's initial history, having my Superintendent write the record from my dictation so that she, who will guide the details of his sanatorium life, and I, who will follow him through his illness, may be fully familiar not only with his physical condition, but his temperament, his personality, and his personal and domestic problems. It is almost as important to know what kind of a family the patient has to live with as to know the extent of his pulmonary involvement. An unlimited time is allowed for the initial story and the patient is encouraged to talk freely. A special effort is made to bring out all of those factors in his life which may have contributed to his reduced resistance and the activation of the disease so that these factors may be recognized and guarded against when the patient resumes his home life. The patient is then advised that at any time during his sanatorium stay he is welcome to unlimited interviews as to his physical condition or personal affairs and in these interviews an effort is made to learn still more of the environment and problems which will confront the patient on his discharge. It may require several such interviews before the patient's confidence is won and his reticence entirely overcome.

When the patient is ready for discharge there is a final interview in which all details which will confront him are brought together and made a matter of record and the patient is given a written outline for his home guidance, this outline being prepared for the individual patient with his personal problems thoroughly in view and never in stereotype form.

At this point the further relationship of the sanatorium with the patient is determined by the attitude of the family physician and this is influenced very largely by the close contact maintained with the doctor during the patient's sanatorium care. If it is the desire of the physician that contact with the sanatorium should be terminated and the details of home care left to the patient, the sanatorium follows up the patient only in a purely impersonal way. As a rule, however, the family physician has come to prefer that the sanatorium shall retain as intimate contact with his patient as possible. Under these circumstances, the patient is supplied with temperature and record blanks which are to be filled out and returned to the sanatorium every two weeks and are to be accompanied by a brief note with information as to any unusual symptoms, as to the amount of exercise and any unusual events in the patient's life. He is assured that these will be regarded as confidential. These reports and letters are always answered by a letter more or less in detail, dictated by the Medical Director himself, and copies of these replies are sent to the patient's physician.

In many cases these semi-monthly letters have been exchanged between the patient and the sanatorium for periods of from two to five years and I believe that they have been particularly beneficial at that stage where the patient is ready to resume gainful occupation.

The patient is urged to remain for many months at least under the weekly observation of his physician and to advise us in his semi-monthly letters as to the opinions which the home doctors may express. Incidentally, it is remarkable how much difficulty the patients encounter in securing this prolonged supervision from their home doctors, especially when there is no evidence of acute illness. In such instances, a tactful letter to the doctor frequently alters his attitude.

If the family doctor prefers, as is frequently the case, the patient returns to the sanatorium for periodic reexamination and advice or is referred by the sanatorium to men specializing in tuberculosis in their own neighborhoods. In the latter case, the examining physician is always supplied with a brief case record and information as to the program the patient is following so that he may not be disturbed by what appear to

him to be conflicting opinions and radical changes in routine.

A record of the home progress of every patient is kept on file in the sanatorium office and this record is brought down to date on each direct or indirect contact with the patient.

As a means of continuing its influence over discharged patients, the sanatorium publishes a little newspaper called the Palm Leaf which, unlike most of the sanatorium papers, is edited by the Medical Director himself. While this publication contains news items relative to former patients and events at the sanatorium which will prove of interest to former patients, its chief value lies in its continued systematic reiteration of those things which are essential to the patient's recovery and which are most likely to be ignored or overlooked by the convalescent patient. Our files contain scores of letters from former patients assuring us that the regular visits of the Palm Leaf have caused them to adhere more strictly to the program leading toward recovery.

Once in a while the Palm Leaf announces what we call a spiritual homecoming and every patient is requested to write to the Medical Director as to his progress and present condition and each patient is also requested to give the names and present addresses of all former sanatorium patients of whom they have knowledge. In this way the records of former patients may be constantly revised and, whenever a patient is found with whom we have had no contact for several months, a personal letter is written asking for a statement of his present condition.

It is our belief that this correspondence extending over several years with semi-monthly individual letters from the head of the institution containing advice, encouragement and necessary warnings has a decided influence on the action of the patient and a distinct influence on his recovery. The information gained from the patient while in the sanatorium, as to his home conditions, his financial status and his domestic problems, makes this correspondence infinitely more personal, more valuable and more helpful.

While there is no pretense that this method of the follow-up of patients is ideal or even adequate, it is none the less true that, in the opinion of a large group of physicians, this contact is one of the most valuable services rendered by the sanatorium. Its success depends upon the intimacy of acquaintance formed in the sanatorium, definite knowledge as to the patient's personal problems and home conditions and the manifestation of genuine interest in the individual. While this laborious service is rendered entirely without cost, it none the less taxes our ingenuity to sufficiently interest the patient so as to cause him to maintain his contact with the sanatorium over the prolonged period which we regard as essential to the best results.

AN OUTLINE OF SOME OF THE ADVANTAGES AND DISADVANTAGES OF VARIOUS AGENTS USED IN ANESTHESIA*

JOHN S. LUNDY, M.D.
Rochester, Minnesota

IN considering the advantages and disadvantages of the various agents used in anesthesia one considers primarily the mortality and secondarily the morbidity associated with the anesthetic agent, both during operation and after operation, regardless of whether the outcome, other than in association with the anesthetic, is fatal. In my brief outline of some of the fundamental principles that guide one, in certain cases, in eliminating from consideration certain anesthetic agents, I shall consider, separately, the mortality that occurs during operation and after operation.

The factors of danger and the factors of safety of the various agents are essentially related to their pharmacologic effects, as modified by the method of, and the skill in, their administration as well as by the physical condition of the patient and the requirements of the operation.

PRIMARY CONSIDERATIONS

Immediate untoward results.—The more commonly used of both the new and the old anes-

*From the Section on Anesthesia, The Mayo Clinic, Rochester, Minnesota. Read at the meeting of the Northern Minnesota Medical Association, Hibbing, September 14, 1931.

thetic and analgesic agents divide themselves into two groups from the standpoint of immediate untoward results: (1) those in which there is little if any margin of safety between failure of the respiration and failure of the heart, and (2) those in which there is a wide margin of safety between failure of the respiration and failure of the heart. In the first group I would place chloroform, ethyl chloride, nupercaine (a-butyl-oxy-cinchonic acid diethyl-ethylene diamide-hydrochloride) and probably cocaine; in the second group, ether, nitrous oxide, ethylene (excluding explosions), procaine, avertin (tribrom-ethyl alcohol) the barbiturates, and morphine.

Delayed untoward results.—The ordinary delayed untoward reactions which occasionally are associated with the use of certain agents may not be easily classified and probably are best pointed out by first mentioning the agents and then the complications. For example, chloroform causes delayed central necrosis of the lobules of the liver; ether, pulmonary and renal complications, and, if patients have diabetes, probably complications involving the pancreas. With the use of nitrous oxide delayed untoward results are not observed unless they are initiated by increase in blood pressure at the time of operation. Not infrequently anoxemia is seen during anesthesia with nitrous oxide. With the use of ethylene, delayed untoward reactions should not occur, unless, because of the inflammability of the agent, a burn has been produced which may later cause death. Ethyl chloride usually does not cause delayed untoward results. Early in the use of avertin colitis developed from its improper application, and patients with pulmonary tuberculosis and cavitation were unfavorably affected. In one case a diabetic patient suffered considerable postoperative shock which in my opinion was due to the avertin.

Delayed untoward results associated with local anesthetics must in part be associated with the trauma of the needle which introduces the agent into the body. For example, headache following lumbar puncture must naturally be expected in cases in which anesthetics are given intraspinally; in some instances the spinal cord may be traumatized, although this must occur rarely. Characteristic pharmacologic effects of the common local anesthetics would lead one to believe that they are not lasting if ordinary doses are used. However, this depends, to some extent, on the concentration of the solution used, and probably, also, on the condition of the nerve cells that make direct contact with the anesthetic. Respiratory embarrassment is associated with large doses of morphine, or of a barbiturate, or both. Pulmonary complications are common following an overdose of a barbiturate with or without morphine. Blood pressure may be lowered and the circulation of the blood slowed, which would tend to the formation of thrombi and emboli. As a rule the danger incident to the use of these agents is more or less proportionate to the dose employed. Under the term "balanced anesthesia," I have previously called attention to the advantage of using a small dose of two or more of these agents.

SECONDARY CONSIDERATIONS

The less significant advantages and disadvantages incident to the use of the various anesthetic agents also hinge on certain essential principles. These have to do with the answer to one or both of two questions: Does an anesthetic or special method of administering an anesthetic make an operation easy or easier than others? Is the use of a certain agent contraindicated by the disease or diseases present? In some cases relaxation is essential to the successful outcome of the operation, and, if other conditions permit, it may be advantageous to use spinal anesthesia, some form of regional block anesthesia such as sacral or brachial plexus block, or ether by the open-drop method. If relaxation is not essential, the gases, with or without ether, or local infiltration may be used. Often the quiet breathing associated with intratracheal anesthesia may be as advantageous as relaxation.

The disease conditions presented by patients are numerous, and a few only can be mentioned here, although they are important in the choice of the anesthetic. In the presence of active pulmonary disease, such as tuberculosis or bronchiectasis, an inhalation anesthetic which tends to irritate pulmonary tissue, such as ether, should be avoided, and gas used instead. However, if relaxation is necessary in such cases, spinal anesthesia may be resorted to for operations below the diaphragm, and for operations above the diaphragm some method of regional block or infiltration anesthesia might be used. In either event, gas may be added if the local or spinal anesthesia is insufficient.

If the patient has diabetes it is often wise to

avoid the potent general anesthetic agents which tend to depress the functions of certain organs, and also to avoid the use of agents which must be destroyed in the body or excreted from it by organs which, because of disease, do not carry any additional burden well. Drugs, such as the barbiturates, are destroyed within the body or eliminated from it other than by way of the lungs, and continue to act until they are destroyed or eliminated; and so, their use is unwise in certain cases in which the functions of organs are seriously impaired. Avertin, too, theoretically may be contraindicated in certain conditions in which organic function is seriously impaired, especially in cases of advanced hepatic and renal disease. The admixture of epinephrine and local anesthetic is not advisable in the presence of hypertension or exophthalmic goiter. It is obvious that inflammable agents are contraindicated if the cautery or other devices which might ignite the anesthetic agent are to be employed. There are certain conditions, such as intrathoracic tumor, which require opening the thorax, and in which pulmonary ventilation and anesthesia must be accomplished simultaneously. In such cases satisfactory results may be more easily obtained if an intratracheal tube is used; the anesthetic is thus administered with oxygen. For many operations, especially plastic operations about the head and neck, the intratracheal method of anesthetization makes the work of the surgeon and the anesthetist easier. Since carbon dioxide increases the coagulability of the blood, patients who tend to bleed and whose clotting time may be delayed may benefit by the addition of carbon dioxide to the anesthetic mixture. This, however, is one of the least of the functions of carbon dioxide; at present this gas is used extensively to control the depth of respiration, to control nausea during spinal anesthesia, to control hiccough following operation, and to hyperventilate the lungs following operation, regardless of whether respiratory embarrassment has come about from overdose of an anesthetic agent or from the extreme effects of morphine or a barbiturate, or both.

Agents and methods available at the present time make it possible to avoid a practice which will probably be unsatisfactory, that is, the use of any anesthetic agent or method as a routine.

THE POCKET FLAP

THE SAFEST METHOD FOR EXTRACTION OF SENILE CATARACT*

CHARLES NELSON SPRATT, M.D.
Minneapolis

IN Les Miserables, Victor Hugo vividly describes the panic that seizes the traveler who, walking along the sea shore at low tide, discovers that he is lost in the quicksands. A similar feeling often overwhelms a patient when told that he has a cataract. The thought of oncoming blindness to many is as terrible as death itself. If the diagnosis is correct and the loss of vision is not due to glaucoma with a hazy lens (often called cataract by the public) a cataract operation offers the greatest hope for the recovery of vision, if the fundus is normal.

From the patient's point of view the restoration of vision, and not the technic or method to be used, is the important problem. What operation will prove the safest and offer the least chance of loss of the eye, the recovery of useful vision, the shortest convalescence, the least postoperative discomfort? It is said that Barraquer, when asked what operation he would choose had he a cataract himself, stated that he would have it done by the intracapsular method, provided he were the operator. If he were not, he would prefer the capsulotomy operation. If the same problem were presented to any other ophthalmologist, I think that he would select the operation which he considered the safest, the one followed by the least number of failures.

The removal of the lens in capsule, which, according to Wood,[1] was first performed by Samuel Sharp of London in 1753 and advocated by Smith, Pagenstecher and Barraquer, is an ideal procedure in that no cortex or capsule remains to cause irritation. Certain operators, such as Smith and Barraquer, acquire a technic that pos-

*Presented before the Section on Ophthalmology of the American Medical Association. Permission for publication obtained from the American Medical Association.

sibly makes the intracapsular operation as safe as the capsulotomy method.

Statistics of excellent operators show that the intracapsular operation is followed by a greater percentage of loss of vitreous than when the capsulotomy operation is done. Zentmayer[2] reports in Smith's 17 operations in Philadelphia a 38 per cent loss; Birdwood[3] gives a 35 per cent loss in 311 operations; Elschnig[4] reports a 2 per cent loss in 144; Dunphy's[5] series at the Massachusetts Eye and Ear Infirmary shows a loss of 18.8 per cent in 441 cases; he also gives Derby's loss as 2 per cent in 200; Husain,[6] 11 per cent in 737 cases; Parker,[7] 18.8 per cent in 100 cases. The statistics of the capsulotomy operation show a much smaller loss of vitreous. Birdwood, in 1,585 cases, had a 10 per cent loss; Ellett,[8] in 600 cases, a 7.6 per cent loss; Dunphy, at the Massachusetts Eye and Ear Infirmary, in 1,821 cases, a 7 per cent loss; Parker, in 1,421 cases, 10 per cent loss; Graefe, as quoted by Barkan,[9] in 669 cases, 2.8 per cent; Ring (collected), in 1,123 simple extractions, 3.9 per cent; Ring (collected), in combined extraction, 6.9 per cent.

I believe that the loss of vitreous is a complication that should and can be avoided, since poor vision and a soft eye with ultimate loss may result. Dunphy has followed fifty cases in which a loss of vitreous occurred and reports that good vision (from 20/20 to 20/30) was obtained in 40 per cent; fair (from 20/40 to 20/50), in 22 per cent; poor (from 20/70 to 20/100), in 18 per cent, and bad (20/200 or less), in 20 per cent. In a rather humorous style, Fradkine[10] speaks of loss of vitreous as not a dangerous accident. He is inclined to think that this leaves a cleaner vitreous, as the cortex and capsule are washed out. This view is not held by other operators.

The operation that has given me the greatest number of successes, the most rapid healing, the shortest convalescence, and which I believe to be the safest operation, is the suture pocket flap method. This is a modification of the Husain flap operation, which in turn is a modification of the Czermark. The method of Husain was called to the attention of the American profession by W. Holbrook Lowell.[11] This consists in making an opening in the conjunctiva about 1 cm. above the sclerocorneal margin. The conjunctiva is dissected to the limbus, and an opening is made with a keratome into the anterior chamber beneath this flap. This incision is enlarged on each side with scissors. The lens is extracted in capsule after an iridectomy. No suture is used unless vitreous is lost.

In May, 1928, I[12] published a description of an operation with a report of fifty-two cases. The method described in that article has since been followed without change.

PREPARATION

The patient is given 20 grains (1.3 Gm.) of barbital or 10 grains (0.65 Gm.) of phenobarbital four hours before the operation and the pupil is dilated with 1 per cent atropine. The operation is done on the patient's own bed or on a stretcher. The skin is washed with full strength hexylresorcinol solution S. T. 37. Anesthesia is produced by four instillations of 4 per cent cocaine at four minute intervals. Subconjunctival or Van Lint injection of the lids with procaine hydrochloride, or paralysis of the orbicularis muscle by the injection of the facial nerve as suggested by Dilliard,[13] have not been made, nor have I used deep orbital injections, as this method is not entirely free from danger. Brusselmans[14] reports a case of cellulitis following deep orbital injections, and McCannel[15] has had a fatal case of cavernous sinus thrombosis.

Many writers seem to think that the orbital injection of a local anesthetic is a recent idea. It may be of interest to quote the suggestion of Halstead in 1884, reported by his assistant Hall:[16] "In addition to the usual application to the conjunctiva, in operations on the eye, an injection into the orbit, in the neighborhood of the ciliary nerves, would doubtless diminish the liability to a very grave accident, . . . namely, in extrusion of the lens, from blepharospasm, occurring during iridectomy performed with the aid of cocaine." It may be noted that Halstead was also the first to use cocaine as an anesthetic by intradermal injection and nerve blocking, and as an injection of the maxillary nerves for the extraction of a tooth.

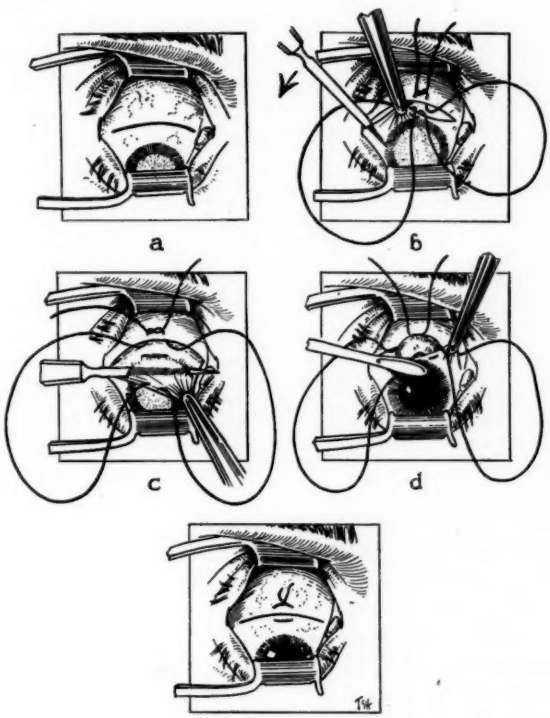
A double thickness of moist gauze is placed over the entire face. This prevents the suture, hands and instruments from coming in contact with the skin. A speculum with solid blades is inserted. The conjunctival sac is irrigated with hexylresorcinol solution S. T. 37, diluted with 3 or 4 parts of water. Epinephrine is dropped into the eye to cause blanching of the conjunctiva.

OPERATION

A horizontal incision from 1.5 to 2 cm. long and 5 mm. above the limbus is made in the con-

junctiva (*a* in the illustration) with small blunt pointed scissors. In cases complicated by glaucoma, where a Lagrange operation is indicated, it is better to make the horizontal incision from 7 to 8 mm. above the limbus. The wide flap is less likely to be followed by separation of the wound. The conjunctival flap with the episcleral tissue is dissected downward to the limbus and extensions are made on each side so as to expose the upper two-fifths of the circumference. If the hemorrhage is troublesome, a small pledget of cotton saturated with epinephrine is placed in the pocket. A mattress suture of 000 black silk in a small round full curve needle is now placed in the center of the edges of the conjunctival wound (*b*). The thread is drawn to each side, forming large loops, and a single knot is made. As the eyeball has not been opened, this can be done safely and easily. One also has definite information as to the behavior of the patient for the rest of the operation. Should he prove to be a "squeezer," the orbicularis muscle may be injected as suggested by Van Lint, or a canthotomy performed. This is necessary in only a few cases.

The rest of the operation, which includes the opening into the globe and the removal of the lens, is done in a sterile field. The possibility of an infection following this method (either at the time of operation or postoperatively), when compared to the opening of the eye with the classic incision at the limbus, is reduced to a minimum. The operator, standing at the patient's head, holds the flap at the temporal portion with a pair of anatomic forceps. The point of a slender, tapering knife is placed beneath the conjunctiva in the pocket on the temporal side. The knife is held in the right hand when operating on the right eye and in the left hand for the left eye. The puncture is made at the limbus as in the ordinary extraction. The handle of the knife is depressed, and the counterpuncture is made directly opposite. Fixation is secured by holding the conjunctival flap. The for-



Details of pocket flap.

ceps are transferred to the nasal part of the flap, which is then turned down over the cornea and away from the point of the knife, thus avoiding the danger of a buttonhole in the conjunctiva (*c*). The incision includes the upper two-fifths of the limbus. The anterior chamber is not evacuated until the incision is nearly completed. The taper of the knife and the conjunctiva overlapping the puncture and the counterpuncture prevent the escape of aqueous. By making a long bevel at the upper portion of the incision so as to include the sclera, a Lagrange operation may also be performed, if indicated.

If the iris is rigid, the sphincter is cut, or if it tends to prolapse, a small iridectomy is made. The anterior capsule is removed with forceps, and the cataract is expressed in the usual way by the application of pressure with a blunt spoon below at the limbus, the flap being held forward and up by the forceps (*d*). This maneuver elongates the globe, separates the wound edges, thus allowing easy extraction of the lens, and tends to prevent loss of vitreous. Any blood or cortex in the anterior chamber is removed by irrigation with Locke's solution or physiologic solution of sodium chloride. Should vitreous appear, the ends of the suture are drawn tight and the wound is immediately closed (*e*), thus preventing any loss. Irrigation is usually done before the suture is tied but may be done afterward, if necessary. Replacement of the iris can be done either before or after tying, by means of a spatula inserted on the opposite side of the central suture. If the patient has difficulty in looking down, or is unruly, or if the conjunctival flap is very thin and apt to be torn, perfect fixation can be secured by a suture in the superior rectus muscle. No assistant is employed during the operation except to hold the suture.

A light dressing is put over both eyes and a shield over the one that is operated on. The patient may sit up with a back rest. Iris prolapse from turning in bed, vomiting or postoperative delirium is not to be feared, as the wound is closed by the tight suture. If the iris is caught in the wound, this iris inclusion serves as a preventive against glaucoma.

Daljang Singh Khana,[17] who performs intracapsular extractions without iridectomy, advises the patient to sit up and not lie down for six hours, in order to guard against iris prolapse. He states that in the prone position the aqueous collects in the anterior chamber and makes the iris float upward, and as the wall is weak at the incision, the pressure all round the iris tends to bulge it out at the base into the incision and thus favors prolapse. In the sitting position, the aqueous fills the anterior chamber from below and its level rise is gradual; thus there is fluid on both sides of the iris, which hangs like a vertical curtain.

The next morning the eye is dressed, 1 per cent atropine is instilled, the bandage is replaced and the patient is allowed to sit up in a chair. On the second day 1 per cent atropine is used twice and the eye that was not operated on is left uncovered. All dressings are removed on the fourth or fifth day. The suture is easily removed at any time between the fifth and the ninth day. Patients are allowed to leave the hospital on the third to the seventh day, depending on the distance to their homes. Several patients have had the two eyes operated on at the same time.

In old persons with atrophic conjunctiva, the flap may be torn as the result of traction or the insertion of the needle. Fixation of the eye with a suture in the superior rectus muscle will avoid the former and the use of a round needle will prevent the latter complication. In eyes with shallow anterior chambers, the flap may be buttonholed because of the counterpuncture being made too far forward. The conjunctival flap should be dissected to the limbus. To indicate the exit of the knife, a shallow nick may be made in the sclera. In the earlier cases, my tendency was to make the incision rather far back in the sclera, as in the Lagrange operation. More bleeding occurs with this incision and there is danger of cutting the iris, thus making an iridectomy simultaneously. In shallow anterior chambers this may be almost unavoidable, but it is an advantage as the lens is more easily delivered, and the combined extraction is safer than the simple.

Most of the patients (80 per cent) went home in a week or less. Those who lived at a distance or were handicapped by having only one eye were kept longer. Many left the hospital on the second day with safety, as a result of the tight union of the sutured flap.

This operation is the application of the general surgical principle that, unless drainage is indicated, tight closure of a wound by layers of tissue is to be made. It is not to be confused with the ordinary sutured conjunctival flap described by Williams, Wurdemann, Kalt, Verhoeff, Elschnig and others, as in these methods the angles

of the wound are open and not protected by conjunctiva.

RESULTS

I have done the pocket flap operation on 196 eyes. Fifty-two of the operations were reported in a previous paper.[12] Ninety-nine of the patients were men and 97 were women. The right eye was operated on 96 times and the left eye 100 times. The simple extraction was done 114 times, the combined operation 82 times.

TABLE 1.—AGES

Ages	Cases
30 to 40	5
40 to 50	12
50 to 60	36
60 to 70	63
70 to 80	61
80 to 90	17
95	1
96	1
Total	196

The ages by decades were as given in Table 1.

The days in the hospital are given in Table 2; 156 patients (80 per cent) were in the hospital seven days or less.

TABLE 2.—DAYS IN HOSPITAL

Days	Cases	Days	Cases
1½	3	8	9
2	10	9	3
3	34	10	5
4	41	11	2
5	17	12	5
6	28	13	5
7	23	14	4
		16	2
Seven days or less..	156	17	1
		18	2
		19	1
		31	1
		More than seven days	40

The astigmatism was as given in Table 3.

Glaucoma was present in ten cases. The vision was as follows: 5/4, two; 5/5, one; 5/6, one; 5/7, one; 5/9, one; nil, four.

There were six patients with diabetes. The vision obtained was as follows: 5/6, one; 5/12, two; 5/9, one; nil, two.

TABLE 3.—ASTIGMATISM

Diopters	Cases
None	12
0 to 1	30
1 to 2	56
2 to 3	39
3 to 4	29
4 to 5	8
5 to 6	2
8 to 9	2
12	1
Unknown	16
Total	196

Among the 196 cases, 11 were excluded as there was light perception only, with faulty projection, and the operation was not justified except for cosmetic reasons, or in the hope that some slight vision might be obtained.

The complications in the eleven cases not included in estimating vision, but in which good operative results were obtained, was as follows: glaucoma, four; detachment, one; diabetes, two; optic atrophy, three; intraocular foreign body, one.

TABLE 4.—VISION

	Number of Cases	
5/3	16	
5/4	60	
5/5	42	
5/6	20	
5/7	14	
5/9	12	
5/12	10	
5/15	2	Senile vitreous changes
5/22	1	Optic atrophy
5/30	1	Leukoma of cornea
5/50	1	Vitreous changes
Lost eye	3	
Unknown	3	
Total	185	

The vision was as given in Table 4.

In this series of 185 extractions, 174 patients, or 94 per cent, obtained vision equal to 5/12 or better. Among the latter, normal vision of 5/5 was present in 118 cases, or 63.7 per cent. The vision of three patients is unknown. Owing to their physical condition and distance of residence, they did not return for visual tests. One, aged 96, had sufficient vision to recognize persons; the second had high myopia; the third, aged 84, had choroidal changes. The latter had vision of 5/9 in the other eye following a previous extraction. The patient with 5/50 vision had vitreous opacities with posterior synechia due to a severe iridocyclitis one year previous.

COMPLICATIONS

In this series, three eyes were lost. A choroidal hemorrhage occurred on the fourth day in a myopic eye. This eye was later removed on account of pain due to increased tension. The wound remained tight and there was no leakage of blood. This demonstrates the firmness of the union.

Iridocyclitis caused the loss of two eyes. In one patient, a woman, aged 84, the flap was buttonholed or torn. An iris prolapse occurred through this tear as in the ordinary limbal inci-

sion. An iridocyclitis developed on the ninth day, resulting in loss of vision. This could have been prevented had an iridectomy been made, and this complication would not have occurred had there been a perfect flap; therefore it should not be classed as a pocket flap operation. A second case was in a woman, aged 78, who had diabetes. The operation on her other eye was successful.

There were five cases of slight subconjunctival iris prolapse.

Two cases of secondary glaucoma developed. These quieted down with resulting good vision.

In twenty-seven cases, a secondary cataract was divided, with improvement of vision.

In the entire series, vitreous presented twelve times. Owing to the immediate closure of the wound by the suture there was an actual loss in only five cases. In four of these, the lens was extracted with the loop.

Vision in cases in which vitreous appeared or was lost was as follows: 5/4, three; 5/5, two; 5/7, three; 5/9, one; 5/15, one; nil, two (glaucoma); total, 12.

DISADVANTAGES

There are two disadvantages to this operation. The first, suggested by Crisp,[18] is a lack of visibility in making the incision. This is more theoretical than real, as the flap can be manipulated so that there is no difficulty in making the puncture and counterpuncture. The second is that more hemorrhage occurs than in the ordinary incision. As the wound is closed by the suture, this blood goes into the anterior chamber rather than into the conjunctival sac. This hyphema is of no significance and clears up in a few days. Other objections, such as the length of time of the operation and the difficulty of removing the silk, could be raised against any sutured incision. The time is well spent if five minutes longer in the operating room will save the patient five days in the hospital. The removal of the suture from the eye does not involve any difficulties.

ADVANTAGES

The advantages of the pocket flap operation are as follows:

1. It offers the least possible chance for infection, as the operation is performed in a sterile field quite separate from the conjunctival sac.

2. With the use of the conjunctival flap as a means of fixation there is less danger of vitreous prolapse, as the traction on the flap causes an elongation of the eyeball and a separation of the edges of the wound; thus the lens is more easily expressed.

3. The suture may at any time be drawn tight to prevent vitreous escape.

4. The insertion of the suture previous to the making of the incision is done with safety. If the patient shows evidence of being a "squeezer," a canthotomy may be done or a suture may be placed in the superior rectus muscle in order to obtain fixation of the eye.

5. In case there is increased tension and a Lagrange operation is advisable, both an extraction and a sclerectomy may be done.

6. Healing takes place in a few hours, the patient may sit up the same day, and he may walk around with the eye covered the second day.

7. As the cornea is not cut, there is no danger of epithelium growing into the wound. In cases in which the incision had been made at the limbus or in the cornea, I have seen a patient with an ununited wound up to thirteen days.

8. After using a sutured pocket flap, the surgeon has the satisfaction of knowing that the patient is practically out of danger of prolapse and infection and that healing will take place immediately. There are several cases in this series in which the eye would have been lost if the large flap had not been used.

9. The vision in uncomplicated cases is as good as or better than that obtained by the small flap incision, as there is less astigmatism in the majority of cases and less striped keratitis.

10. Nausea and vomiting after cataract extraction are without serious consequences, as the sutured flap is a positive safeguard against iris prolapse. Law[19] has collected from Moorfields 141 cases of cataract extraction with vomiting in fifteen. There were ill effects in five of these and actual iris prolapse in two cases.

11. Should postoperative delirium occur, a sutured conjunctiva is a factor of great advantage as there is slight risk of a ruptured wound. In my experience, delirium has occurred but once in 800 operations.

12. A prolonged confinement in bed is not only uncomfortable to old persons but also subjects them to the danger of hypostatic congestion. With the sutured flap, this possibility is en-

tirely avoided, as the patient may with safety sit up immediately after operation.

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LARYNGEAL EMERGENCIES IN INFANTS AND CHILDREN*

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OBSTRUCTION of the larynx is an emergency. The degree of the emergency depends upon the extent and suddenness of the obstruction. There are instances where complete obstruction develops so quickly that death occurs before any medical aid can be secured. In any case, treatment should be immediate upon the establishment of the diagnosis. The nature of the obstruction determines the therapeutic procedure, as all cases of acute laryngeal obstruction should not be treated in the same routine manner.

The etiology of acute laryngeal obstruction was clarified enormously by the discovery of bacteria. Differentiation, particularly of lesions due to diphtheria infection, made a more definite classification possible. The next great advance was the invention of the direct laryngoscope. By its use, we are able to examine the larynx of a child suffering from laryngeal symptoms. By direct vision we are enabled to locate the point of obstruction, whether sub- or supraglottic. We can see a membrane, the motility of the vocal cords, the presence of secretion, edema, foreign bodies, or congenital defects. I know of but few contraindications to a direct laryngoscopic examination. I have performed it in many homes without difficulty, for it is not necessary that the patient be in a hospital for this examination. With such an examination there should be very little misunderstanding concerning the etiology of acute laryngeal obstruction. But that such is not the case is demonstrated by the persistence in textbooks on both pediatrics and laryngology in retaining the outworn terms "spasmodic croup," "false croup," "thymic croup," as synonyms of acute laryngitis or laryngismus stridulus. Coakley's textbook, published in 1930, states (page 587) "in infants no examination of the larynx can be made owing to the age of the patient," and again (page 494) "it is seldom possible to examine the larynx of a child." Richards[1] asserts, "Called to the home in a case of sudden and severe obstruction, the laryngologist must of neces-

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sity rely on tracheotomy or indirect intubation," implying that laryngoscopy cannot be satisfactorily performed in a home.

Acute laryngeal obstruction in children may be classified as follows:

1. Congenital malformations
   a. Webs
   b. Absent tracheal rings or collapse of trachea
   c. Exaggerated infantile larynx with collapse (stridor)
2. Birth injuries
   a. Dislocations
   b. Paralysis
3. Edema
   a. Primary
      1. Angioneurotic
   b. Secondary
      1. To lesions in the neighboring structures
      2. To general diseases
      3. Post-bronchoscopic
4. Inflammations
   a. Non-membranous
      1. Acute laryngitis, non-streptococcic
      2. Acute laryngitis, streptococcic
   b. Membranous
      1. Diphtheritic
      2. Non-diphtheritic
      3. Vincent infection
      4. Scleroma
      5. Crusts in laryngitis sicca
5. Neuroses
   a. Paralysis
      1. Central
      2. Peripheral
   b. Spasm
      1. Central
      2. Peripheral
6. Laryngismus stridulus
7. Foreign body
8. Tumor

Acute laryngeal obstruction, no matter what the cause, presents certain symptoms. Much valuable information may be gained from a comprehensive history, including information as to inoculation against diphtheria checked by the Schick test and by a general survey of the patient, including his temperature, pulse and respiration. If an X-ray is available, a plate should always be taken before laryngoscopy. Cultures and other laboratory findings should be obtained if time and facilities permit.

Inspiratory stridor is usually the first symptom observed. If extreme, it is accompanied by substernal retraction and the use of the accessory respiratory muscles. A high degree of restlessness soon occurs, and if allowed to continue long results in fatigue. Fatigue is a positive indication for immediate relief.

Cyanosis is not always present. It should not be the factor that determines interference. It may be present when an acute, complete obstruction occurs, or in the late stages of an incomplete obstruction. After cyanosis develops, the prognosis is less favorable.

Hoarseness is a valuable sign in determining the degree of obstruction or the presence of a membrane. Aphonia occurs at times.

Temperature indicates inflammation, while its absence suggests a foreign body, or laryngismus stridulus.

If none of these symptoms are severe, then no emergency exists and delay is justifiable. Should there be doubt, a direct laryngoscopy is indicated. This is much better than palpation, intubation or tracheotomy. Mirror laryngoscopy should be attempted when there is a chance of success, but the direct method can always be used.

The larynx in children has several peculiarities which should be understood before any examination is made. Some of these are responsible for the greater frequency of laryngeal emergencies in childhood.

The larynx is at a higher level in infants than in adults. The epiglottis is opposite the first cervical vertebra during late fetal life and the first year of infancy. It descends the distance of two vertebræ between the first and thirteenth years. The inferior margin of the cricoid cartilage is opposite the third vertebra at birth and descends to the level of the sixth cervical vertebra.[2]

The fact that the respiratory rate is higher in infants causes the respiratory function of the vocal cords to come into play more frequently. The relatively greater size of the tongue for sucking and the normal predominance of nasal breathing in infancy make mouth breathing more difficult for the infant than the adult.

At birth, one-half the glottic boundary is composed of vocal cord and one-half by the arytenoid vocal process. The process really projects into the cord and further reduces this soft fold. At

the age of six the cord constitutes more than half the glottic boundary and at puberty two-thirds.

During the first three years the larynx grows rapidly; the next three years, less rapidly; and from six until puberty, quite gradually.

The larynx at birth is funnel shaped, the relation of a cross section of the glottis to that of the trachea being five to one. This funnel shape makes the importance of subglottic swelling much greater.

The cricoid plate tips backward as does the epiglottis, making the laryngeal orifice dorsal and at nearly a right angle to the axis of the trachea. The upper orifice is relatively narrow laterally. The cartilages are softer and make the possibility of collapse more likely.

The mucous membrane is more vascular and looser, especially in the subglottic region. The lymphatics are richer and there is much greater reflex irritability of the larynx.

Congenital anomalies of the larynx are not common. A lesion producing stenosis of the larynx at birth is usually incompatible with life. The most common symptom of congenital abnormality, in my experience, is the "congenital stridor." This condition is characterized by a croaking sound on inspiration without cyanosis or dyspnea. It is present at birth and usually disappears in the second year. The laryngoscopic picture is usually that of a curved, soft epiglottis with aryepiglottic folds so near together that they close the upper orifice of the larynx like a valve. This condition is thought to be purely anatomical by some, while others hold that it is due to an incoördination of the respiratory movements of the larynx and that it is central in origin. Those favoring the neurosis idea point to cases which develop after birth, and in which the stridor is absent while the baby sleeps.

CASE REPORTS

Case 1.—A baby, twelve months old, referred by Dr. Glenn Matchan, had breathed noisily since birth, this stridor having been inspiratory and not associated with hoarseness nor cyanosis. He was undernourished and nursed poorly. X-ray of the chest demonstrated a fairly large thymus. Direct laryngoscopy revealed the false cords and aryepiglottic folds pulled in at each inspiration. A bronchoscope was inserted and no tracheal compression found. A diagnosis of congenital stridor was made and a good prognosis given and the baby was taken home. Two months later he had some difficulty in feeding, butthis soon cleared up and he gained sixteen ounces in a few days. Then suddenly he had such severe laryngeal obstruction that death occurred before a doctor could reach him (thirty-five miles in the country).

Webs of the larynx occur in the newborn, but rarely cause enough obstruction to create an emergency. I can find no case recorded which required tracheotomy. This is the only fatal case of congenital stridor I have seen.

Inspiratory collapse of the esophago-tracheal party wall into the trachea occurs occasionally at birth and may be responsible for serious symptoms, as in the following case:

Case 2.—A newborn, referred by Dr. Rood Taylor, was a "blue baby" at birth and suffered from attacks of cyanosis at intervals. Two other children in this family had died at birth from congenital defects of various types. On examination the larynx seemed normal. The trachea closed on inspiration from a collapse of the party wall. No other abnormality was found. The infant lived but a few days. Autopsy showed a normal larynx. There were very few tracheal rings present and these were smaller than normal, thus accounting for the tracheal collapse.

Severe birth injuries involving the larynx are rare. I have had no experience with this condition.

Edema of the larynx in children from renal or cardiac disease is rare. The treatment of the underlying disease is of most importance. The laryngeal emergency is usually slow in development and adequate preparation for its treatment can be made. Puncture of the edematous area should be tried repeatedly, before tracheotomy is attempted.

Edema of angio-neurotic origin may occur in children. It may be the only sign of the disease, though more often there is a history of swelling of the lips, eyelids, or other parts. The family history should be investigated. The onset is usually sudden without preceding symptoms. The temperature is not elevated and death may occur before a physician arrives.

Laryngoscope examination shows a marked swelling of the arytenoids and aryepiglottic folds as well as of the epiglottis. The vocal cords are not involved. The swelling is whitish as a rule and does not give the appearance of serum below the mucosa. In texture it looks rather firm. Jackson recommends early tracheotomy as the edema is apt to persist. However, some cases do well after adrenalin is given subcutaneously as in the following case:

Case 3.—A boy, aged 6, was referred by Dr. F. J. Kucera. He felt perfectly well and was playing out doors when suddenly his breathing became difficult and he became cyanotic. There was no history of a for-

eign body. An injection of adrenalin was given by Dr. Kucera and the patient was hurried into the city (about ten miles). The child's stridor could be heard as he came down the hall to my office. A mirror examination was made and a marked edema of the epiglottis and arytenoids was seen. The child was so much better when he reached town that no tracheotomy was done. The edema cleared up in a few hours and no further attacks have occurred.

Post-bronchoscopic edema occurs in small children, even after careful use of the smallest tubes. I have had many such cases after the extraction of an organic foreign body, such as a peanut. As it is likely to develop within the first forty-eight hours, the patient should remain in the hospital for that length of time. If the foreign body has been in the bronchus any length of time, and a drowned lung is present, the postoperative laryngeal obstruction is not entirely edema, but may be due in part to lack of drainage of the thick secretion. In such a case I do a tracheotomy, but otherwise I have found intubation to be quite satisfactory. I allow the tube to remain for two or three days and then remove it. If obstruction persists after two extubations, I perform a tracheotomy.

The intubation is sufficient usually because there is no infection, but merely a traumatic swelling. I have found it necessary to follow intubation with tracheotomy in but a few cases.

Edema secondary to disease of the neighboring structures is a very serious condition. The patient is usually suffering from the toxemia of the original infection and is not able to withstand the added burden of respiratory obstruction. Relief must be prompt and radical measures are indicated early. The primary condition must be relieved if possible and if the secondary edema does not promptly subside, tracheotomy should be done. Intubation is not satisfactory, as the tube may be buried in the swollen tissue or it may be below the obstruction and thus be shut off just as the larynx was.

The following cases illustrate this type of edema:

Case 4.—A baby fourteen months old referred by Dr. M. Seham had had a sore throat associated with temperature and dysphagia for three weeks. These persisted and the baby lost considerable weight. Dr. Seham diagnosed retropharyngeal abscess one week before I saw the patient and advised its evacuation. The parents waited but finally brought the baby in. He was in bad shape, breathing with much difficulty and seemed to require emergency treatment. The abscess was incised with no anesthetic and a large amount of pus removed by suction, but the child stopped breathing. A bronchoscope was inserted at once and after several minutes respirations started. Oxygen was given for about six hours through the bronchoscope and finally the baby breathed fairly well. The next day an intubation tube was inserted and breathing was good for two and one-half days, after which cardiac failure resulted in death.

Case 5.—A boy, seven years of age, referred by Dr. E. D. Anderson, had a sudden attack of sore throat with marked malaise and temperature of 101 degrees. He was very toxic from the onset of his illness. The cervical glands on the right side became involved and one week later a swelling appeared in the region posterior to the right tonsillar fossa. This swelling became soft and fluctuant, so it seemed advisable to drain the abscess. Under gas anesthesia it was incised and suction used. Respirations became labored and it was necessary to use artificial respiration for about three minutes before breathing became natural. A tracheotomy was done to prevent possible recurrence of respiratory obstruction. Recovery was normal, with the exception of a persistently contracted right pupil, and a temporary paralysis of the right half of the palate.

Case 6.—An eight year old girl, referred by Dr. N. O. Pearce, had always been unusually healthy, but was suffering from a mild sore throat of twelve hours duration. Early the next morning she awoke on account of marked dyspnea. She became cyanotic and seemed to be in an alarming condition. She appeared very toxic, her temperature was 104 degrees and there was an acetone odor to her breath. A direct laryngoscopic examination was done at home and an enormously swollen epiglottis and very acutely inflamed lingual tonsils were seen. She was sent to the hospital and preparations made to perform a tracheotomy if necessary. Her general condition improved rapidly after she was given fluids, and her local laryngeal symptoms subsided in about three days. A stiff neck persisted for nearly two weeks, when complete recovery resulted.

Edema from abscess of the larynx is not uncommon in infancy, according to Jackson.[3] The laryngoscopic picture of acute inflammation, plus swelling, is quite definite. McIntosh and Nichol[4] report five cases of abscess of the larynx in infants, and state that laryngoscopy was of no value in localizing the lesion. All cases were opened externally. In one case the abscess was found during a tracheotomy. Aphonia was present. This group of cases is very interesting, but I am at a loss to understand how a larynx, obstructed to such a degree, could show nothing on laryngoscopy.

Abscess of the larynx results frequently from the use of X-ray or radium in treating papillomata. Overexposure produces necrosis of the laryngeal cartilages and abscess results.

Inflammation.—Acute laryngitis in children is frequently quite different from the same condition in adults, largely because the anatomical peculiarities above described predispose to the production of spasm. It is associated with dyspnea, frequently of sudden onset and occurring, usually, at night. The child goes to bed feeling well except for a mild coryza and awakens in an alarming attack of laryngeal obstruction. This is what most people mean by "croup," which the textbooks insist upon calling "true croup." The obstruction may be both expiratory and inspiratory and retraction is present in varying degrees as well as cyanosis. There is hoarseness but not aphonia and the temperature is elevated. Cough is usually present and of a metallic character.

The attack is over as a rule before a physician arrives. I have asked several pediatrists if they ever saw such an attack and usually they say, "When I was young I used to get out of bed and hurry to such a case, but I never got there in time. Now, I tell them to use steam inhalations and let me know what happens. I also tell them the attack will recur the next two nights."

These attacks are said to occur more frequently in children with infected tonsils and adenoids. If so, croup should be listed as an indication for tonsillectomy. It seems also that there is a constitutional type of child that is more susceptible to croup.

The etiology of croup is variable. It may be that when the child goes to bed the recumbent position, with a congested nose, tends to mouth breathing. This dries the secretion in the larynx and small crusts form on the mucous membrane causing irritation and some obstruction. The reaction to a foreign body is set up, leading to spasm. Such a spasm can be seen when inserting a laryngoscope to be a closure of the whole glottis, including the ventricular bands and the aryepiglottic folds. The action of the abductor muscles, being the most powerful in their action, predominates and the larynx is closed. Sometimes the pads below the true cords swell while the patient is lying down. This swelling may start a spasm of the larynx.

Acute laryngitis, with spasm, is the most common laryngeal emergency. It is a very alarming condition, but fortunately not serious, as a rule. In cases that do not clear up promptly a laryngoscopic examination should be made to make certain of the diagnosis.

Occasionally it is necessary to intubate for acute laryngitis with spasm. I have seen but one such case. This child, eight years of age (case 7), was intubated in the middle of the night after a laryngoscopy revealed no edema and no membrane. The tube was left in place thirty-six hours and no further trouble developed.

"Acute streptococcic laryngitis" is the common name given the more virulent type of laryngitis. This is the condition the older books call "non-membranous croup" and others call "infectious laryngotracheitis," "flu laryngitis," "phlegmonous laryngitis." This type of laryngitis occurs in measles, scarlet fever, small-pox and chicken-pox.

This condition simulates diphtheria in that there is marked prostration, fever, chills, convulsions, croupy cough, and frequently acidosis, hoarseness, dyspnea and cyanosis. The diagnosis can easily and quickly be made by direct laryngoscopy. The laryngoscopic picture is a fiery red mucous membrane with hemorrhagic spots in places. The lining is velvety and causes the tracheal rings to become invisible. Edema of the orifice of the larynx may be present so that the cords, themselves, cannot be seen. There is no membrane and but little secretion.

Such a patient has his laryngeal obstruction to contend with plus his general toxemia. Both need treatment, but the obstruction, if severe, should be the first to be relieved. I have tried intubation in these cases, but have not always been satisfied with the results as I have had to do a tracheotomy quite frequently. Hence, I usually recommend immediate tracheotomy as the best procedure. Immediately preceding tracheotomy, I usually insert a bronchoscope to render breathing safe during the operation and, also, to help locate the trachea more easily. Mosher's "life saver" tube may be used instead of the bronchoscope.

This condition is frequently confused with whooping cough and with the laryngotracheitis of a vegetable foreign body. The X-ray usually will establish the diagnosis of a non-opaque foreign body.

Case 8.—A child referred by Dr. Siperstein had developed sudden laryngeal obstruction during the progress of a cold and sore throat. He had been immunized against diphtheria. Laryngoscopy showed no foreign body, but a red swollen larynx with a dirty grey

exudate. Intubation was performed, with recovery in about one week.

Case 9.—A boy, aged 6, referred by Dr. Wilder, had had a sore throat and cold for twenty-four hours. During the night sudden dyspnea and dysphagia developed and he breathed noisily. At examination the child seemed very toxic, his temperature was 104 degrees, and his breath had an acetone odor. Laryngoscopy showed marked edema of the epiglottis, but the cords were not involved. Steam inhalations with some oxygen and cold packs were prescribed and the next day the larynx was better, but pleurisy developed and later empyema. Recovery eventually occurred.

Case 10.—A boy, aged 2, referred by Dr. E. D. Anderson, developed laryngeal obstruction during an attack of measles. Intubation was performed which gave him relief as long as the tube remained in place. He coughed out the tube on six different occasions, so a tracheotomy was performed, the bronchoscope being inserted as a preliminary safety measure. A partial subglottic stenosis developed, making it necessary to be extremely cautious in decanalizing. After tightly corking the tracheotomy tube for forty-eight hours it was removed, but after a few days it had to be replaced. The stenosis was dilated several times and finally decanalizing was accomplished. A year later there was still a wheeze present on forced respiration. The trachea was again dilated and following this the boy has seemed comfortable.

Membranous Laryngitis.—Vincent's angina, scleroma and non-diphtheritic membranous laryngitis are very rare in children. A membranous condition can be diagnosed by laryngoscopy. Antidiphtheritic antitoxin should be given even though the child has been immunized for diphtheria and checked up with a Schick test. Bacterial studies for positive diagnosis can be made later.

If the condition requires immediate relief, the membrane should be aspirated and, if suction will remove it, no further relief may be needed. Hospitalization of such a case is absolutely necessary. At the Minneapolis General Hospital, considerable success has been obtained with suction, cutting down the number of intubations and tracheotomies to a marked degree.

Numerous physicians in the United States have abandoned intubation in laryngeal diphtheria. They believe intubation tends to produce stenosis of the larynx, which tracheotomy does not. I believe intubation has saved many lives and should be given a trial. The operation should be quickly and gently performed with the proper sized tubes. If extubation is not successful in three or four days, tracheotomy should be performed and the intubation tube removed.

Paralysis of the vocal cords is not common in young children. Its presence at birth due to injury to the inferior laryngeal nerve is reported. The more common causes are diphtheria and poliomyelitis and in some cases no cause can be determined. Children with a suddenly paralyzed cord breathe with an exceedingly loud stridor. This noise is very suggestive of a paralysis of a vocal cord. A snap-shot diagnosis might be made when this characteristic noise is observed.

Case 11.—A baby four months of age, referred by Dr. L. F. Richdorf, suddenly developed very noisy breathing. He had some elevation of temperature but his color was quite good and there was little substernal retraction. There was no history of a foreign body and no membrane was seen in the throat. I had recently seen two infants with almost the same type of breathing due to paralysis of one vocal cord and made a tentative diagnosis of a similar condition in this case. Laryngoscopy confirmed this opinion. The next day X-ray showed a pneumonia of the superior lobe on the right which explained the paralysis of the right vocal cord. Recovery was complete.

This type of case tends to clear up in time and usually no emergency treatment is needed, but the symptoms are so alarming that laryngoscopy is indicated for diagnosis.

A case of spasm of the glottis at birth due to intracranial hemorrhage was reported by Monro,[5] but no laryngoscopic examination was made and intubation gave no relief. Bilateral spasm produces a complete but not permanent closure of the glottis. Bilateral paralysis is permanent but does not produce a complete closure of the glottis. Spasm due to inflammation has already been considered. Spasm due to foreign body or the passing of a laryngoscope will be considered later.

Laryngismus stridulus is a form of laryngeal stridor in children of sudden onset without temperature or previous laryngeal symptoms and no malaise nor prostration. It appears usually between the ages of four months and two years. There are twice as many boys affected as girls.

As a rule, laryngismus stridulus occurs in feeble children, those with tetany, rickets or malnutrition. The onset is sudden, usually at night. The lightest cases are characterized by simple sudden stoppage of breath, ending with a deep, long drawn out and often loud inspiration. This condition is sometimes called breath-holding.

In severe cases inspirations due to glottic narrowing are audible at the onset, become more marked as the stenosis increases, and finally end in a cessation of breathing. Pallor and cyanosis

rapidly develop, sweating appears, and finally unconsciousness. Convulsions may occur. Death within a few seconds from suffocation or cardiac paralysis does occasionally, though rarely, take place. Otherwise the attack ends with an inspiration in which a high degree of laryngeal stenosis is still evident. Successive inspirations become easier and longer in reverse order to the onset of the attack.

This condition is considered by most authorities in pediatrics to be a spasm, but St. Clair Thompson's latest book and Jackson's latest book both state that laryngismus stridulus is not a spasm, but a collapse of the feeble tissues at the vestibule of the larynx. Thompson describes the attack as due to the child attempting to breathe through its obstructed nose until it becomes half asphyxiated and then, due to the air hunger, a sudden deep inspiration is taken. As the diaphragm descends with extra force and the glottis does not open, the soft parts are sucked together before the in-rushing air current. As further efforts to breathe are made, the blood becomes more venous until the carbon dioxide stimulates the respiratory center and the glottis opens, ending the attack.

Riese[6] believes the posticus muscles have a nerve supply from the sympathetic system. He refers to Onaidis' anatomical work and gives other reasons for this belief. Laryngismus stridulus, in his opinion, is due to a paresis of this sympathetic nervous supply and is not a spasm of the adductor muscles. He reports cases which have responded to the use of pituitary extract and believes this supports his view.

Jackson states, "The laryngoscopic appearance is typical. The mucosa is pale and distinctly non-inflammatory. At inspiration, the upper laryngeal margin is drawn in and the cords draw together and separate but slightly at expiration. Insertion of a bronchoscope stops the stridor and tracheotomy is not indicated."

Treatment of this condition during the attack would vary according to the accepted theory of its cause. During the interval between attacks the general condition, such as rickets, tetany, diseased tonsils and adenoids, gastrointestinal irregularity or parasites should be corrected.

If the attack is considered a spasm, antispasmodics are advised and the Germans recommend hedonal by rectum, which affects the breathing centers, powerfully reducing the excitability. Others use chloral, bromide, chloroform, etc.

If the attack is considered a collapse, respiratory stimulants should be used such as cold water dashed into the face, smelling salts to stimulate the nasal mucous membrane and the maneuver of pulling the tongue forward.

Case 12.—A child one year of age, referred by Dr. C. L. Rodgers, had a sudden laryngeal obstruction occurring about midnight, which did not clear up promptly. The larynx was examined at home by the direct method and laryngismus stridulus diagnosed. Intubation was required, which had to be repeated about twelve times during twelve days. Bronchoscopy was negative as was the chest X-ray. Insertion of the bronchoscope did not stop the attacks. A culture proved negative. On the thirteenth day the tube was again coughed up and this time breathing was quiet. Recovery resulted.

A foreign body lodged in the larynx is not common. In two hundred and fifty proven cases of foreign body in the air or food passages, I have had but eight in which the foreign body lodged in the larynx, and, of these, five were in children. Many patients with a foreign body in the bronchus have laryngeal symptoms caused by the passage of the foreign body, or by digital or instrumental trauma in attempts to remove it, or by trauma due to the foreign body bouncing in the trachea and hitting the glottis from below. Several of my patients had been given diphtheria antitoxin before the diagnosis of foreign body was made.

The presence of a foreign body should be considered as a possibility in all children whose laryngeal symptoms develop suddenly and do not disappear as is usual in croup or laryngismus stridulus. If the symptoms are so severe that some treatment is necessary, intubation by the indirect method would be unwise, as inserting the tube might result in more trouble. Inspection of the larynx will show the foreign body and its removal can be accomplished by the direct method. The resulting trauma can be appropriately treated if necessary.

Case 13.—I recently saw a child a year old, who was left in the care of her five year old sister. In the afternoon she was taken out of doors in the cold and during the night, about 2 a. m., she became "croupy." A doctor was called who prescribed steam and the baby was better the next day, but not well. Another doctor from the same clinic saw the baby and diagnosed bronchitis. A day or so later a third doctor saw the child and diagnosed asthma. An X-ray of the chest

was taken and, at the top of the film, a safety pin was seen in the larynx.

Case 14.—A baby one year old was referred by Dr. Schultz with symptoms of laryngeal diphtheria for which treatment was carried out ten days. X-ray revealed a safety pin in the baby's larynx.

A papilloma is the tumor commonly found in the larynx of an infant. This may cause all the symptoms of severe laryngeal obstruction. After the diagnosis is made, if emergency exists, a tracheotomy is indicated as the tumors have to be removed later and this cannot be done safely with intubation.

Tracheotomy alone may cure some cases of papilloma.

Case 15.—A patient of Dr. E. H. Parker's had a tracheotomy at the age of two with no further treatment. The tube was worn for fifteen years with but one or two changes. Her voice became normal and respiration was normal with the tube corked, but the mother would not consent to its removal. Finally it was removed and a plastic operation done to close the fistula, which was successful. The larynx is perfectly normal.

Epulation may cure others. In one case treatment was started at the age of two and one-half years. There had been hoarseness since birth, cough and attacks of cyanosis on exertion. Eleven operations were performed over a period of two years, resulting in a clear voice but low in pitch. There has been no recurrence in the past six years.

Fulguration seems to help others. Radium is of value but tends to produce necrosis of the laryngeal cartilages and may lead to abscess of the larynx or an esophagotracheal fistula.

Cure in some instances does not seem possible. A patient thirty-three years of age, referred by Dr. Nathanson, wore a tracheotomy tube thirty-one years. The larynx is still full of papillomata. Operations at ranging intervals have been necessary all her life.

Other types of tumors such as cysts and angiomata occur rarely and the treatment varies according to the condition present.

Conclusion.—Direct laryngoscopy has made possible the accurate diagnosis of laryngeal conditions in infants. The older ideas have been clarified and treatment made more logical.

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SPONTANEOUS PNEUMOTHORAX*

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OUR purpose is not to report a large number of unusual cases, not to advance any new theory as to its cause, nor to recommend any new procedure for its treatment. It is merely to present a condition which does occur frequently enough so that we should all see a few cases, and a condition which is easy to diagnose, if we will just keep it in mind.

Spontaneous pneumothorax means the accumulation of air in the pleural cavity from any internal cause. Tuberculosis is considered the cause in eighty to ninety per cent of the cases by most writers, the perforation of the visceral pleura resulting from the rupture of a subpleural tuberculous focus into the pleural cavity. The remaining ten to twenty per cent are the result of a variety of causes, some of which are —the rupture of an emphysematous bleb, the tearing of an adhesion during violent exercise, or a paroxysm of cough; or any pulmonary disease, as abscess, gangrene, infarction or emphysema, which can cause an erosion or rupture of

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the visceral pleura. Also, an esophageal growth may result in an ulceration through the mediastinal pleura, or a perforation may be caused in this location by a sharp pointed foreign body in the esophagus. Then there are a few cases for which no cause can be found. These are called idiopathic spontaneous pneumothorax. These patients usually recover promptly and no sequelæ follow. Most likely these so-called idiopathic cases are due to the rupture of small blebs, or the rupture of small superficial tubercles.

A spontaneous pneumothorax may be partial or complete, and may remain simply an air filled cavity, or it may become associated with a serous, purulent, or hemorrhagic effusion. The effusions generally indicate the presence of some active pulmonary disease.

A pneumothorax is said to be open when the pleural sac communicates freely with the external air, either through a wound in the chest wall, or through a bronchus; closed when the opening becomes sealed and the accumulated air is gradually absorbed; or valvular when the opening permits air to enter during inspiration, but closes during expiration with the result that air accumulates under increasing pressure. This latter condition is spoken of as tension pneumothorax.

Our cases, which will be reported later, are eight in number, and have come to us during a period of five years. The fact that only two of these were associated with definite tuberculosis leads us to believe that in a general practice tuberculosis may be a lesser factor in the etiology of spontaneous pneumothorax than has been taught. And, quite naturally, the statistics garnered from hospitals and sanatoria would deal with abnormal percentages of tuberculous individuals.

The onset of a spontaneous pneumothorax is usually sudden, and characterized by a sharp pain on the affected side, which may extend up and out into the arms, and may extend down into the abdomen. This is followed by marked dyspnea, cyanosis, and the general symptoms of shock. If the collapse is the result of a pre-existing tuberculosis, or other inflammatory disease, the onset may be insidious and the patient may not know when it happened. This is due to the presence of adhesions which prevent the lung from collapsing suddenly or completely.

On examination, the following signs are found: There is little or no motion with respiration on the affected side, and the intercostal spaces are obliterated. The heart is displaced away from the affected side. The liver may be greatly depressed when the right side in involved. The breath sounds and voice sounds are suppressed, or entirely absent. Tactile fremitus is absent or greatly diminished. About this time one begins to suspect a pleural effusion, but on percussion, instead of feeling and hearing a dull flat thud, one is surprised to hear a highly tympanitic note. If fluid is also present, there is a corresponding area of dullness in the base, which comes up to a definite horizontal level and changes with a change in position.

The roentgen examination, made by either fluoroscope or film, and better by both, confirms the diagnosis.

The duration of the disease depends on the underlying condition, and on the presence or absence of infection. The case without apparent cause, the idiopathic spontaneous pneumothorax, which is believed to be the result of a rupture of a small sub-pleural tubercle or emphysematous bleb, or the tearing of a small adhesion, usually clears up in from two weeks to two months. The duration, however, may be indefinite, and at least one case has been reported that was permanent. The prognosis in active tuberculous cases is naturally more serious, and in these cases it has the same significance as hemoptysis.

The treatment is a simple matter in most cases. Morphine may be required for the pain at onset, and shock, if present, is treated in the usual way. As it is necessary for the fistula to close before the lung can expand, the patient should be kept in bed and quiet. Cough should be controlled and deep inspirations should be avoided. The latter tend to aspirate more air or infectious material into the pleural cavity. To this end, the affected side should be strapped.

In valvular cases, when the air accumulates under increasing pressure, and dyspnea and cyanosis become increasingly severe, it is necessary to aspirate just enough to relieve the symptoms.

Bilateral involvement does occur and is rapidly fatal unless some of the air can be aspirated.

When fluid develops, aspirations should be delayed until the fistula has had time to close, unless it is producing pressure symptoms.

Case 1.—R. B. B., a bookkeeper, aged 59, was operated upon in February, 1921, for a ruptured duodenal

ulcer. One month later he had to be operated upon again for the same trouble. In May, 1925, while walking down the street, he was taken with a sudden severe pain across the upper abdomen. The abdomen was rigid and, quite naturally, it was suspected that another duodenal ulcer had ruptured. His white count, however, was only 12,600. The following day it was lower and his general condition was better. Because of some confusing signs in his lungs he was taken to the fluoroscope, where a right pneumothorax was discovered. Recovery was uneventful. In 1928 he was brought into the hospital with an acute appendicitis. Before operation his lungs were fluoroscoped and appeared normal. The appendix was gangrenous and he died.

Case 2.—S. D. F., a farmer, aged 48, was referred to the clinic supposedly suffering from an acute cholecystitis. Thirty-six hours previously he was awakened at 4 a. m. by a feeling of great distress and oppression in the right chest. He could not take a full breath. Later he had pains across the lower chest, which radiated around both sides to the back. There was some waterbrash, but he ate well and felt better after eating. On examination the left chest was found immobile and the intercostal spaces obliterated. Breath sounds were distant and percussion hyperresonant.

The diagnosis of left spontaneous pneumothorax was confirmed by X-ray.

In going into the past history of this patient, it was learned that he had had a cough with occasional blood streaked sputum for the past three years, also frequent night sweats, which made one suspect tuberculosis as the likely cause, although the X-ray showed no active lesion, and no tubercle bacilli were found in five sputum examinations. A recent report from this man said that he was working steadily and the cough was about the same as before.

This case was especially interesting for two reasons: the attack came on while he was asleep and the pain was mostly on the right side and the pneumothorax was found on the left.

Case 3.—G. R., a male, clerk, twenty-five years of age, was working at his desk when seized by a sudden severe pain over the heart, referred into the left shoulder and arm and down into the left abdomen. It brought out a cold sweat and he felt nauseated. He was brought in and seen at the Clinic twenty minutes later. Lips and nails were cyanotic, and heart tones at the apex were barely audible. The left rectus muscle was boardlike. He was sent to the hospital as a coronary occlusion, which would have been an unusual accident in a person of his age. His temperature was 99, w.b.c. 11,300 and electrocardiogram normal. The latter was accepted with the tentative diagnosis because the characteristic changes in coronary occlusion are often not seen until the next day. The following morning the left chest was splinted, breath sounds distant, fremitus diminished and percussion note hyperresonant.

Diagnosis: Left pneumothorax, confirmed by X-ray.

X-ray after two weeks in bed showed only a small amount of air at the left apex.

X-ray after one month showed complete absorption.

X-ray after four months, negative for tuberculosis, and he has been well since.

Case 4.—M. F. M., a farmer, aged 22, had had a sudden sharp pain in the left chest five days previously, while stooping over. He was in bed one day, and unable to work since the onset because of pain and inability to take a deep breath. On examination, the heart was found displaced to the right and the tones indistinct. The percussion note on the left was hyperresonant.

The X-ray showed a left pneumothorax, and healed tuberculosis in the right apex. He could not go into the hospital so was told to stay in bed one month at home and keep a temperature record. After one month he returned. He said he had been in bed just one day, but that he had done nothing requiring exertion.

The lungs were completely re-expanded, he had gained two and one-half pounds and there were no signs of active tuberculosis.

Case 5.—S. U., female, aged 38, a teacher, was sitting quietly in a chair after a leisurely walk when she was seized with a sudden sharp pain in the right chest. She came to the Clinic the next day. Breath sounds were distant and percussion hyperresonant over the right chest. No tactile or vocal fremitus were present, and the heart was displaced to the left.

X-ray showed a right pneumothorax. There was complete absorption of air after two weeks in bed.

X-ray three months later and again two years later showed no tuberculosis.

Case 6.—K. McK., a female, aged 27, a stenographer, had had an incipient tuberculosis in 1926 involving both apices. By March, 1930, the tuberculosis was thought to have been completely arrested. On jumping out of bed to close the window, she was taken with a quick sharp pain in the right chest. On examination the right chest was found immobile, the breath sounds distant, and percussion note hyperresonant.

X-ray showed a right pneumothorax and she was kept in bed three months.

X-ray taken one year later, in May, 1931, showed healed lesions in both apices.

Case 7.—R. D., a male, aged 16, student, seemed perfectly well, had a good appetite, was active and gaining weight until September 28, 1930, when he had a severe coughing spell, so severe that it left him faint and trembling. The next day he had another, but not quite so severe. On the third day he was awakened at 2 a. m. with a cough, followed by hemoptysis of about one-half pint of blood. Examination one-half hour later, hemorrhage had stopped, pulse 140, temperature 102. Over left chest there was no expansion, no breath sounds and percussion was tympanitic. The heart was markedly displaced to the right. Diagnosis was pulmonary tuberculosis, pulmonary hemorrhage and left spontaneous pneumothorax. He was kept flat on his back. The air began to be absorbed very rapidly and one week later he was moved to the hospital, where we intended to continue the pneumothorax artificially.

The X-ray showed lung completely re-expanded and

a diffuse tuberculous infection throughout both lungs. He died two months later.

This case is unusual in that an advanced tuberculosis was ushered in by a pulmonary hemorrhage and a spontaneous pneumothorax, the latter most probably stopping the hemorrhage. There was no pleural effusion and no sign of any blood having escaped into the pleural cavity. The air was completely absorbed and the heart back to normal position at the end of one week.

Case 8.—P. B., a male, aged 21, bookkeeper, was taken with a sudden pain in the upper left chest and arm, after walking across the office floor. Breathing became short and fast and he could hardly talk. On examination, lips and finger nails were cyanotic, excursion of left chest was restricted, breath sounds were distant and percussion hyperresonant. The heart was displaced to the right.

An X-ray of the chest showed a left pneumothorax.

He had had four similar previous attacks.

In 1928 he "flopped" a pole vault. The attack came on that evening.

January, 1929, he jumped over a snowbank and attack came on one hour later.

August, 1929, attack came on while walking down town and he had to be carried home.

November, 1929, attack came on while shaving and he had to be carried in to bed.

He saw no doctor after these first spells, although he says they were more severe than the last one. He stayed in bed one or two days, after which he noticed no dyspnea, but had to be careful about lifting or straining for a few days. This time he was kept in bed for two weeks, after which re-expansion of the lung was complete.

X-ray one year later showed normal lungs.

This case is interesting, not only because of the recurrences, but also because it illustrates the fact that an attack can come on several hours after the exciting cause.

While these case reports are not complete histories, they do contain the salient points. They show some of the conditions which can be confusing in the diagnosis, namely, cholecystitis, coronary occlusion, ruptured duodenal ulcer and pleurisy. They also show how comparatively simple the diagnosis is when this possibility is borne in mind.

The teaching that tuberculosis is the most common cause must certainly be respected, and an individual should not be dismissed upon recovery from the pneumothorax, but should be systematically followed for many months for further evidence of tuberculosis.

HEART DISEASE IN CHILDREN*

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THE increasing force with which our attention has been called to the rising importance of heart disease as a cause of death makes it seem well that we occasionally take inventory of our knowledge of the subject, that we miss no opportunity to halt the progress of this greatest contributor to mortality in man. In the years 1917 to 1925[1] the population of the country increased over 10 per cent, the deaths from heart disease doubled, and the deaths to which heart disease contributed increased 81 per cent. Comparative figures of accuracy are difficult to obtain but when it is realized that more than 25 per cent of this great mortality[4] is due to forms of heart disease originating in childhood it brings to us the importance of attacking this problem where first seen, and, more important, of instituting prophylactic measures.

While the great mortality from heart disease is in adult life, about 20 children per 100,000 from 5 to 19 years of age in the United States Registration area (comprising 37 states and 82 per cent of the population) die yearly of heart disease, which ranks third among the causes of death in this group. The lack of the dramatic element in this disease and the insidious nature of its onset and progress have tended to prevent the attention being paid to the problem which it deserves. However, through the activity of the American Heart Association and the formation of local organizations to increase interest in the work, there has been in the past few years an awakening to the fact that this problem must be met with the intelligence we have been giving to that of tuberculosis, a problem similar in many aspects.

GENERAL CONSIDERATIONS IN CHILDHOOD

There are certain general considerations regarding the heart in children which are well to

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bear in mind. The heart itself is relatively large normally. The apex beat up to the age of seven years is located in the fourth left intercostal space, so that its presence in the fifth space before this time is evidence of hypertrophy. Enlargement of the heart in children causes an early precordial bulging of the chest wall which so accommodates itself to pressure. Normal sinus arrhythmias are frequent, sometimes so marked as to make them difficult to tell from pathologic rhythms. Extrasystoles are infrequent in children in the first decade,[5] and when found are usually due to a toxic myocardium, or organic heart disease.

Bradycardias may be normal or may represent such toxic myocardial effects as those of jaundice and diphtheria toxin, the effects of intra-cranial disease, or varying grades of heart block. The heart sounds in the first year are of the tick-tock type, not to be confused with the ominous import of such a sound in the failing adult heart. Murmurs of functional type are frequent, usually basal, soft and blowing in quality, but sometimes hard to differentiate from true pathologic murmurs.

CLASSIFICATION

Heart disease in childhood is rather simply classified as congenital and acquired. About 10 per cent fall into the group of congenital disease, or, as they usually actually are, congenital heart defects, which will be considered briefly.

CONGENITAL HEART DISEASE

Etiologically,[2] congenital heart disease may occur from : (1) abnormal development (patent interventricular septa, etc.); (2) fetal endocarditis (resulting in congenital stenosis, usually pulmonary); and (3) failure of normal prenatal orifices to close (as patent ductus arteriosus and foramen ovale). The examples mentioned comprise the great majority of conditions encountered, others being decidedly infrequent and seldom diagnosed. These are often combined with each other, the signs due to two or more lesions making diagnosis especially difficult, although the more important lesion usually is emphasized by its own signs and can be so identified.[3]

Patent foramen ovale, the most frequent, is clinically unimportant because it is rarely large enough to embarrass the heart unless associated with other more serious lesions. Patent interventricular septa are next in frequency, do not usually produce cyanosis and are characterized by a substernal thrill, loud rough murmur heard best to the left of the sternum and transmitted over the precordium and to the back, an accentuated pulmonic second sound, and a globular heart by X-ray. A good many of these patients have other associated congenital lesions. They often live to adult life but usually die early from endocarditis or decompensation.

Pulmonary stenosis, uncomplicated, is usually fatal during the first year, but when associated with patent interventricular septum, which helps to compensate for the pulmonary lesion, adult life may be reached. The average age at death is nine to twelve years and those which reach adult life tend to develop decompensation easily. They are characterized by cyanosis, clubbed fingers, systolic thrill over the second and third inter space to the left of the sternum, enlargement of the heart, especially to the right, a loud harsh basal systolic murmur, transmitted over the entire heart, and a weak or absent pulmonary second sound.

Patent ductus arteriosus is not often found alone, but when so occurring the prognosis is usually good. More often does it compensate for septal and pulmonary valve defects. It is characterized by a rough systolic thrill over the base of the heart and a loud rough murmur rising with systole, passing over into diastole and then diminishing, heard above the heart. The second pulmonic sound is accentuated.

The foregoing characteristics make it often possible to diagnose a lesion but often the combinations create great difficulties and only the fact that a defect exists can be recognized. There is little in the way of treatment available. The cyanotic child should be protected from exertion, should have plenty of rest, good hygiene, and effort should be made to avoid infection. It is well to prepare educationally for a sedentary type of occupation. There is little indicated medically but nitroglycerine is occasionally of value in the attacks of cyanosis to which many are subject.

ACQUIRED HEART DISEASE

With a few exceptions, the story of acquired heart disease in children is essentially that of rheumatic fever. Diphtheria toxin produces a severe toxic myocardial insufficiency, not infrequently fatal. The contrast between the severe

degree of injury shown by the heart muscle and the fairly complete and permanent restitution of cardiac efficiency is most striking. This condition is preventable and practically never seen where sufficient antitoxin is given within the first thirty-six hours.

The cardiac sequelæ of scarlet fever have so many similarities to rheumatic heart disease that it is not unlikely that they have the same pathogenesis. Pathologically they are very much alike and occur in similar age periods with rheumatic disease.

The ulcerative endocarditis of various types of septicemias must be mentioned among the acquired types. Practically it is unimportant because it is a late manifestation of conditions which are nearly always fatal, and no known treatment affects its course, which is characterized by variable murmurs of endocardial origin and embolic phenomena. Subacute bacterial endocarditis, infrequently observed, has been thought by some to be etiologically identical to rheumatic carditis, and is probably not so invariably fatal as originally considered.

RHEUMATIC FEVER

It is, however, with the consideration of rheumatic fever that the most important field of cardiac disease in children is entered. Nearly 90 per cent of cardiac diseases is rheumatic in origin. Of these patients a considerable proportion die in childhood, and the rest constitute the bulk of adult heart disease up to the age of forty, a large proportion being crippled or killed within this period. To know rheumatic heart disease one must know rheumatic fever, because the heart condition is only one of the protean manifestations of this disease, characterized as it is by exudative and proliferative lesions of the serous membranes, sinuses, tonsils, joints, nervous system and heart. It is therefore just a phase of a disease which is seen in many forms. It is the most important phase because it is the most crippling, and occurs most frequently, it being definitely demonstrable that the heart is involved in 90 to 100 per cent of all cases of rheumatic fever.[6]

Since the onset of rheumatic heart disease, or carditis, is usually insidious, a knowledge of the other manifestations of rheumatic fever and tendency to remissions[20] will point out earlier the presence of this disease. This should lead to the important periodic observation for cardiac signs and especially for the signs of activity of the infection, and permit the institution of intelligent management.

These signs may be summarized as follows:

1. Polyarthritis: the well known migrating type of acute arthritis, affecting usually the larger joints, with extreme tenderness and good response to the coal tar derivatives. This is often the first manifestation, usually occurring before the age of ten.

2. Joint and growing pains: fleeting pains in various joints, or in the muscles, chiefly of the thigh or calf of the legs, or in the hamstrings just behind the knees.[8,9] They may be intermittent or persistent, and are not infrequently the earliest and only manifestations preceding cardiac involvement.

3. Tonsilitis: occurring in about 50 per cent of the cases and present as a first manifestation in 14.3 per cent of a series of 500 cases.[7]

4. Chorea: occurring in 42.8 per cent of the aforementioned series.

5. Rheumatic nodules: small rice-like bodies under the skin, especially over the bony prominences and joints. They are associated with other very severe manifestations, and occur in about 15 per cent of cases, which as a group show a high mortality.[7]

6. Upper respiratory infections and acute nephritis[10] may be included as manifestations.

These various manifestations, including the carditis, rarely occur under three years of age, usually from six to ten years, and have a marked tendency to recrudescence. The younger the patient the more the tendency, although a marked increase in the recurrences is found at puberty. The later the disease manifests itself the more likely that the recurrences will be widely separated and the development of heart signs will appear later.

OCCURRENCE

Contrary to what has frequently been supposed, the majority of children with rheumatic carditis come from moderately well-to-do homes. They do not live in an environment of dampness, and are not overcrowded in their habitations. They live chiefly in temperate climates, and only a very small proportion are from other than the white race (4.6 per cent in 500 cases).[7]

It is interesting to note that a series of studies

of familial infection shows that in 29 per cent,[11] 36 per cent[12] and 50 per cent[13] of the families having rheumatic cardiac children, two or more children were found to have this disease. Also while about 10 per cent of those with rheumatic cardiac disease give no history of other manifestations of rheumatic fever, a high incidence of these symptoms can be found in the histories of the unaffected members of the family. Recognizing the marked similarity of many aspects of tuberculosis to those of rheumatic fever it is significant to point to a study by St. Lawrence, who in comparing the cases of each disease discovered in affected families found that 14.8 per cent of exposed individuals in rheumatic families were attacked by rheumatic fever and 14.6 per cent of those in tuberculous families were affected by some form of clinical tuberculosis. In view of the stress laid upon the importance of control of contacts in tuberculosis it is of more than passing interest to consider these observations.

ETIOLOGY

As to etiology it must be admitted that while no specific agent has yet been incriminated, the streptococcus is generally considered to be the cause. Numerous workers have isolated such an organism with varying success from blood and tissue cultures taken from rheumatic patients. Clawson[24] has been successful in 50 per cent of his cases, and also feels that there is much evidence pointing to the same etiology existing here as in subacute bacterial endocarditis, where the streptococcus is so regularly found.

CLINICAL FORMS

Rheumatic carditis occurs as a myocarditis, endocarditis, or pericarditis, often associated, but probably occurring in frequency in the order named. Repeated work has shown that the heart muscle is affected in practically all cases of rheumatic fever as demonstrated by electrocardiographic studies. Seham[14] has shown that after six months of age the normal mechanism is the same as in the adult, and that the child is subject to the same abnormalities. Among the changes found are an almost constant increase in the conduction time (P-R interval) which is unaffected by antirheumatic drugs, bundle branch and arborization changes, a great variety of changes in the S-T interval as lengthening of the S wave upward and convexity or concavity of the S-T interval, and changes in the T wave. Where any doubt exists as to myocardial involvement, the electrocardiogram is of great value. With the subsidence of the attack the myocardial phase usually recedes, but occasionally there may remain a myocarditis as demonstrated by precordial discomfort, persistent fever, persistent leukocytosis, anemia, anorexia, enlarged heart, relative valvular insufficiency or tachycardia.

Endocarditis, or rheumatic valvulitis as it is better called from its now recognized pathology, is not easily detected in its incipient stages where its physical signs are due to the valve deformity occasioned by swelling, and a variable murmur, systolic or presystolic, may be the only finding. Usually the mitral valve, less often the aortic, and infrequently the others are involved, and it is the cicatricial changes associated with the healing process occurring here and producing the typical clinical features of valve deformity, which may seriously embarrass the heart long after the active inflammatory process has subsided. These changes proceed at variable speeds, apparently depending on the extent of the valvulitis, and this accounts for the marked delay in appearance of the typical picture which embraces so large a portion of the cardiopaths in early adult life. The marked tendency to recurrence of rheumatic infection is seen here also and the multiple valve involvement is probably always due to multiple infection, the later ones of which are practically always the causes of decompensation when seen in children.

The typical valve lesion produced is stenosis of the mitral valve as the scarring progresses, it being relatively infrequent, as Cabot[15] has shown, to find an uncomplicated mitral insufficiency. The earliest signs are the loud sharp apical first tone, and the accentuated, reduplicated pulmonic second tone, with a soft transmitted apical systolic murmur. Later the typical presystolic or mid-diastolic murmur appears, associated with the characteristic outline as shown by the X-ray. The aortic valve usually develops an insufficiency as the lesion progresses, with its to and fro blowing basal systolic and diastolic murmurs (heard best as a rule over the second right interspace, less often under the sternum or as low as the fourth left space), the high pulse pressure, water hammer pulse, capillary pulsations, and Duroziez' sign. Aortic stenosis is more difficult to recognize and occurs much more often than

it is diagnosed, the characteristic basal thrill, loud rough basal systolic murmur, and plateau pulse being infrequently combined as a clinical picture.

Pericarditis is less frequently seen. Before the age of five it is seldom rheumatic, being usually secondary to one of the acute exanthemata, typhoid, erysipelas, or other infection. After five years it is usually rheumatic, often associated with a severe pancarditis. It may be fibrinous, serous, or suppurative in type, associated with or without a palpable or audible friction rub at the base, and is often missed in diagnosis as it is overshadowed by other features of the disease. The rapidly widening percussion area, atelectasis of the base of the left lung, distant rapid heart sounds, marked substernal pain and orthopnea, as well as the friction rub which is pathognomonic, indicate the diagnosis. Chronic adhesive pericarditis may occur in children, and when advanced enough to produce signs of heart failure, is serious. The electrocardiogram is helpful in diagnosis, and cardiolysis may be of help in treatment.

SIGNS OF ACTIVITY

Recognizing the early appearance of heart involvement in rheumatic fever, and the tendency for the infection to persist in a low grade form for a long time, it is necessary to look for signs of activity of the infection, especially in the heart, that proper treatment may be pursued. Since these signs will be discussed later under the matter of treatment, they will not be further dealt with here except to state that their recognition as such may lead to the consideration of rheumatic fever in children where chronic infections of uncertain diagnosis have persisted.

IRREGULARITIES

Irregularities of the heart are infrequent in children, but any of those found in adults may also occur here. The practical absence of extrasystoles in the normal child[5] makes such an ordinary arrhythmia of adult life a more significant occurrence in childhood. The normal sinus arrythmia is often so marked and difficult to interpret clinically that only the electrocardiogram will distinguish it from a rhythm with many extrasystoles or auricular fibrillation or flutter. The latter two are infrequent and nearly always associated with advanced and grave heart disease. Paroxysmal tachycardia, paroxysmal flutter, or paroxysmal auricular fibrillation are uncommon, the first occurring occasionally in later childhood, and the latter two being almost always a part of degenerative heart disease, which is seldom seen in early life.

TREATMENT

If the many similar aspects of tuberculosis and rheumatic fever would lead to a greater similarity in the general plan of treatment of these patients, there would undoubtedly be much less chronic heart disease left after the infection has been eliminated. There is no question but that a large number of these patients are permitted to resume activity before the infection has entirely subsided, and the failure of development of an adequate defense against the infection increases the tendency to recrudescences which are so characteristic of the condition. The disease must be treated as a chronic one, and Swift has found much better results in his series where the patients are kept in bed from two to three months or longer according to the persistence of signs of activity.

The common and alleviating use of salicylates and allied drugs in the acute stages of rheumatic fever makes the patients so comfortable that it serves to mask the presence of certain indications. It is apparently most useful in combating the exudative phenomena of the disease, as it is of no demonstrable value in chorea or carditis where the lesions are mainly proliferative.

The absence of any specific therapeutic agent for rheumatic fever makes it obvious that the treatment must be general and symptomatic. Good nursing care is essential and it is unnecessary to go into details which are common to all textbooks, to extol the virtues of rest, environment, nutrition, heliotherapy and others. The frequency of multiple infections in a family makes it seem wise that a careful technic of handling the patient, and advice to those exposed regarding the possibilities of danger, be stressed in management. The patient with active infection should be kept in bed until all signs of activity have subsided, even though this may mean many months. These signs are important to know and may be outlined as follows:

1. Fever. This is always to be considered a sign of activity, although other signs may be present without it. Since it is usually highest in those cases with exudative phenomena, it is nat-

urally most marked in those in which the coal tar derivatives are most comforting and efficient in alleviating the condition, best exemplified by the polyarthritis. The temperature falls often to normal under such therapy and it is a not uncommon mistake to permit a patient to resume activity while still under these drugs which are masking the picture of activity of infection from the symptomatic and febrile point of view. Therefore no patient should be considered afebrile until the temperature remains normal after the patient is free from the influence of such drugs. In certain instances the temperature will show an occasional rise at intervals of several days and this should not be ignored. At least ten days of normal temperature should be shown before considering the infection inactive from this angle.

2. Pains: Muscle, joint, and precordial pains are often an indication of activity, and should be so considered until proved otherwise. As in fever, the masking effect of the antirheumatic drugs is marked, and it is better to have had the patient off these drugs about two weeks, before these signs can be considered as gone.

3. Leukocytosis: Repeated leukocyte counts give valuable information as to activity. With subsidence of the infection, the counts gradually come down to normal, the curve of reduction following the curve of fever decline in a somewhat delayed manner. Any delay in the approach of leukocyte count to normal must be considered a sign of activity.

4. Anemia: Anemia being fairly constantly associated with activity should be carefully considered. As the infection subsides this should improve, although not infrequently the anemias which are associated with mitral stenosis are found to be most resistant to therapy, even in the absence of other signs of activity. Thus great caution should be exercised in regarding an infection as inactive where the anemia proves resistant to treatment.

5. Pulse response: The pulse rate should have returned to normal with subsidence of infection and a normal type of rhythm be present. The response to the usual exercise test will give valuable help in determining the heart's efficiency,[7] the return to a previous rate requiring more than three minutes being considered abnormal.

6. The child should show a normal gain in weight.

7. Signs of fatigability, lack of appetite, afternoon irritability, and restless or delayed sleep are often signs of activity and should be relieved before the infection can be considered inactive.

8. Signs of heart failure in children, as basal lung râles, congestion of the liver, dependent edema, cyanosis, etc., are practically always caused by an active rheumatic carditis.

After the activity has subsided a prescribed course of gradually increasing exercise should be worked out as well as possible. The child will usually show if it is being pushed too fast by the poor heart response to exercise and by the tendency to avoid exertion which distresses it and certain types of playing with other children which lead to undue fatigue. As convalescence proceeds the child will usually be able to pursue a normal course of living, with full myocardial compensation. Breaks in compensation, as stated, are nearly always due to lighting up of the infection,[19] and in such an event the treatment must be repeated.

In the acute stage drugs are never indicated except for symptomatic relief. Sodium salicylate still remains the most reliable of the safer products to control the joint symptoms. Where the carditis is the only manifestation the patient is often restless and as complete relaxation as possible should be secured. For this distress Tr. Opii, two to four drops every three hours in older children, is often very helpful. Digitalis[17] is contraindicated in the acute stages, probably acting as a toxin to the heart muscle. Serious accidents may occur from its use.

In that very small group of decompensated patients without active infection, the heart is always enormously enlarged as the result of repeated infections and the therapy is the same as that used in adults. Here digitalis is indicated but the patients are very refractory to treatment and the prognosis is decidedly bad as to life expectancy.

Since most of these children are of school age, the routine of their education imposes certain burdens which should be considered.[18] Their instructors should be acquainted with the problem. It is wiser that these children should be permitted to enter and leave school outside of the

regular hours, and be excused from such exertions as gymnasium and fire drill. Many of them under close supervision can partake in athletics, but the competitive variety should be forbidden. Most of them require no special solicitude, but for those who do, it may prevent the lighting up of the infection which undue fatigue can precipitate. Adequate rest is just as essential as in tuberculosis.

The question of tonsillectomy has been very carefully studied.[1,21,22] There is little question that tonsillitis may be one of the manifestations of rheumatic fever, and as the tonsils are not the sole focus of the disease, their removal would not be expected to cure it. Nevertheless a tendency to frequent upper respiratory infections which is often eliminated by the removal of diseased tonsils may so reduce the resistance of the patients that the rheumatic fever lights up. Kaiser,[21] in an analysis of 48,000 school children, observed that the tonsillectomized child without previous rheumatic fever has a much better chance to escape the disease than the one with tonsils, and that scarlet fever, heart disease, and recurrent attacks of rheumatic fever are less common where the tonsils have been removed.

PROPHYLAXIS

While the prevention of rheumatic heart disease, a goal sought by the profession, is somewhat discouraging in the absence of control of the etiologic agent, there are certain observations which may be suggested as helping to aid this end:

1. Periodic examination of children. To this the parents must be educated, and emphasis must be laid on the importance of the pre-school age, before the child is seen by the school physician. The family physician is in the best position to guide such activity.

2. Removal of foci of infection in teeth, tonsils and sinuses. While authorities disagree on the problem of teeth removal in children, all are agreed that roentgenologically demonstrated root infection is adequate reason for such action. The intelligent coöperation of the dentist is necessary here. Demonstrable infection in the tonsils or sinuses indicates its removal, and the history of repeated attacks of tonsillitis reads its own verdict for tonsillectomy.

3. Adequate rest after infections. Detention in bed for several days after any acute infection and repeated later examinations will give assurance that the physical condition of the child is satisfactory before resuming activity.

4. Heliotherapy over long periods seems to definitely increase the resistance to infections. Significant may be the fact that the highest incidence of rheumatic fever occurs at the end of the winter months, and in the temperate climes.

5. The maintenance of satisfactory nutrition is of great importance in building up resistance to infection.

PROGNOSIS

Considering our experience with patients suffering from rheumatic carditis, about 75 per cent of them will be restored to a normal functional capacity on recovery. The rest represents patients with varying grades of compensation. The majority will be found to be held back by the presence of extra-cardiac foci of infections, occasionally by overweight conditions and toxic states as hyperthyroidism. The correction of these is usually sufficient to bring back compensation with fair reserve. Four to 5 per cent of the patients have low grade persisting rheumatic fever, must be kept in bed, and the outlook is decidedly bad. One to two per cent will be afebrile decompensated children who have had repeated rheumatic infections, who have failed to develop resistance to the infection, and in whom the outlook is unqualifiedly bad. Of rheumatic children up to the age of fifteen years, about 10 per cent will die in that period, usually of rheumatic heart disease. There are no known reliable figures on the outlook for the 75 per cent who recover functionally. However it is known that while many escape further infection and have not developed a sufficient or progressive enough degree of damage to later embarrass them, a great many others develop recurrences later, or show the effects of slow cicatrization of valve defects, and eventually prove the most substantial contributors to the group of heart patients below the age of forty. It is in this group that we hope to materially improve the prognosis through the control of rheumatic fever in children.

SUMMARY

The problem of heart disease in children opens up for us a means of attempting to alleviate much suffering, not only in children, but in early adult life.

Congenital heart defects cannot practically be prevented, and when seen are simply problems of management of activity and protection against infection.

Rheumatic heart disease is deserving of much study. It is felt that much of the crippling type of this disease may be prevented by adequate care while the infection is active, and it is urged that an attempt be made to so guide every patient through this stage and the later period of tendency to recrudescence so that further damage may be avoided.

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THE TREATMENT OF RICKETS*

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RICKETS offers a striking example of a comparatively large number of diseases that have undergone a marked modification during the last two decades. The cases of rickets encountered fifteen or twenty years ago were more florid than those seen today. Now the disease is usually of so mild a type that it is far more frequently overlooked than diagnosed and consequently a large number of cases are untreated.

It is not the purpose of this paper to discuss the diagnosis of rickets or to remind you of its almost universal presence when prophylactic measures are disregarded. Rather it is hoped to emphasize the necessity of treatment by recalling its frequency and again drawing your attention to its relationship to upper respiratory tract infections, its effect on the prognosis of such diseases as pneumonia and its remote influence on functional and organic disturbances of later life. The present treatment has been largely developed during the last decade.

No attempt will be made to discuss the treatment of rickets from a public health standpoint. As an economic problem it is of greatest interest to those dwelling in large cities. The disease, however, does exist in smaller communities and in the country, but to a far lesser extent. In some of the small cities in the territory encom-

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passed by this society, industry is seemingly unable to solve the basic problem of continuous employment at an adequate wage. Consequently increasing demands will be made upon the medical profession for time, knowledge and even money to meet community health problems. Rickets is not the least of these problems. The fact that some localities are now treating rickets from a communal standpoint may have some significance for us.

PRENATAL CARE

In considering preventive measures from an individual standpoint, prenatal care has failed to offer the benefits expected. While a certain predisposition or susceptibility to rickets is recognized as having some relationship to faulty nutrition in the mother, experience does not lead us to believe that much can be expected from prenatal measures. It is true that nutritional disorders in the mother require consideration and the usual recognized measures should be taken to insure healthy babies of full term but more specific treatment has failed to produce striking results. Hess and Weinstock[1] gave expectant mothers cod liver oil the last two months of pregnancy without apparently affecting the incidence of rickets in their babies. Other measures such as the prenatal irradiations by ultra-violet light have also failed.

DIETARY TREATMENT

In considering the prevention and treatment of rickets from a dietary standpoint we have to bear in mind that milk, either human or animal, is the universal food for infants.

Human milk possesses antirachitic properties to a greater degree than any other food. The incidence of rickets among nursing infants is far less than in those fed on cow's milk. The reason for this is unknown, but it is agreed that it is not entirely due to its greater content of antirachitic vitamin. Human milk is not, however, to be considered a specific for either the prevention or the cure of rickets. We must remember that the vast increase in the incidence of rickets in the seventeenth century, a wave of such great proportions that it involved most of Europe and led to the formation in England of the commission headed by Glissen, occurred at a period when all babies were breast fed. The incidence of rickets of the present generation is indicated in a study by Hess[2] in New York, who showed that even well nourished breast fed babies of mothers on a generous and varied dietary developed rickets in about 33.3 per cent by March unless they received some specific therapy and in the course of the subsequent year at least 50 per cent showed definite signs. Similar observations have been recorded by other observers.

The lack of the complete protective property of breast milk has not been sufficiently recognized. This has led to the belief that the use of cod liver oil and other recognized specifics is unnecessary for the breast-fed child. Under present conditions all babies require protective therapy of some kind.

Mothers' milk may be made specifically antirachitic by irradiating the nursing mothers. Hess[3] and more recently Gerstenberger[4] have irradiated mothers with excellent results. The latter in two cases of non-healing rickets observed marked progress when this therapy was instituted. He was not able to achieve the same results by giving mothers cod liver oil.

Cow's milk contains a comparatively small amount of the antirachitic vitamin. This is not improved by modification, condensing or drying unless the specific factor is added. Neither is it possible to increase the antirachitic properties of milk by improving the hygienic conditions of the cow. Little difference is noted in the antirachitic titer of milk when the cows are exposed to sun or kept indoors, but it has been shown that cows exposed to ultra-violet rays from artificial sources elaborate the antirachitic factor and excrete it in the milk. The feeding of a pint of cod liver oil has been without success in increasing this factor. Hess[5] has recently reported encouraging results by feeding cows with irradiated yeast and viosterol. If this should prove practical on a universal scale, it would automatically supply the infant with the antirachitic vitamins.

The yolk of eggs furnishes a demonstrable amount of the antirachitic factor. Egg whites have no such protective value and even in small amounts may increase the intensity of the disorder.

The addition of cream and butter is thought to increase the protective value of diets. The amount of butter fat, however, necessary to appreciably increase the antirachitic factor must be regarded as having possibilities of introducing other nutritional disorders.

Fruit juices, cereals, and vegetables have no protective value.

The indirect use of the ultra-violet rays obtained by giving foods activated by sufficient exposures to produce the specific antirachitic factor is attractive. Milk, particularly dried milk, has been so treated for a number of years. Other foods, especially cereals, have also been activated. The amount of the specific factor in foods so treated is small. Therefore, the quantity required to produce satisfactory results is so large that such activated foods are advised only as adjuvants to other treatment.

An inadequate diet resulting in a subnormal gain may result in rickets. If the diet is suddenly increased to a point which results in a rapid gain in weight without a proportionate increase in length, rickets is likely to develop.

An adequate diet resulting in a normal rate of growth is the greatest protection that may be expected from a dietary standpoint.

HYGIENIC MEASURES

Measures usually included under the term "good hygiene" should not be neglected because of the beneficent effect upon the infant, but it is doubtful if any except sunlight have a pronounced effect on either the prevention or cure of rickets. Lack of exercise in a child that can not stand can be of little moment in the development of rickets. Massage and salt baths may increase the nutrition of the muscle. Fresh air, while desirable, is without specific effect. Out of door life in our latitude can not be expected to be of value if the atmosphere contains sufficient dust, smoke or moisture (fog) to exert a screening effect upon the sun's rays. Changes of climate are beneficial when they make the desirable solar rays more available.

DIFFICULTY IN EVALUATING SPECIFICS

We are fortunate in having several specific curative agents. Attempts to properly evaluate these are attended with many difficulties. Many factors have to be considered, as for example the rate of growth of the infant, the season of the year, the degree of coöperation of the mothers and the severity of the case. Other complicating factors are diarrhea, repeated upper respiratory tract infections, extreme feeding difficulties, anemia, enlarged spleen and the complicating porosis occasionally seen in children who have been bedridden. Premature infants and twins usually require intense treatment by two or more specific agents.

COD LIVER OIL

A consideration of the several specifics for rickets must give first place to cod liver oil. From the time that it was first used early in the eighteenth cenutry until recently its specificity has been frequently questioned and occasionally denied. Kassowitz,[6] an authority of his time, introduced the use of elementary phosphorus which he suspended in cod liver oil. He attributed his excellent results entirely to the phosphorus. Compere[7] has again recently raised the question as to the value of phosphorus combined with the oil. The conclusions of both men have been questioned by Hess,[8] who recognizes the calcification of the bone following the use of this drug but points to the failure of calcification of the proliferating cartilage.

That cod liver oil is today universally acknowledged as a specific is due probably first to Mellanby,[9] who, in the course of his experimental study of rickets in dogs, published roentgenograms which left no doubt that calcification of the epiphyses can be brought about by the administration of cod liver oil. Park and Howland[10] and others corroborated this work. In addition, other investigators have shown its favorable effect on the calcium and inorganic phosphorus of the blood.

The proper dosage of cod liver oil depends upon several factors, the most important of which is the rate of growth of the infant. As a preventive measure it may be given in five drop doses to a child of two weeks. This may be gradually increased so that at four months the child is taking one teaspoonful two or three times daily, depending upon the other antirachitic measures employed. As a curative agent larger doses are necessary. If indicated, a dessertspoonful two or three times daily may be given and is usually easily tolerated at the sixth month.

Like all specific remedies, cod liver oil may occasionally fail to prevent or cure rickets. Failures may be due to the refusal of the baby to take the oil. Such refusals are augmented by neurotic mothers who dislike the odor of the oil and make this apparent. Occasionally the oil is regurgitated. Perseverance for a week or two in either of these conditions usually results favorably. Failure to prevent rickets in breast fed babies is occasionally encountered. This may be

due to too low dosage of cod liver oil but the low calcium and phosphorus content in mother's milk has to be considered in such cases. In the rare cases of frank rickets where partial failure follows the use of oil it is probably due to the impossibility of giving sufficient of the antirachitic factor. This condition is obviously easily handled by adding ergosterol to the oil, a combination usually necessary for premature infants and twins. Untoward results need not be feared as the toxic dose of ergosterol is approximately forty times the normal therapeutic dose.

Another possible factor in the failure of cod liver oil is the doubt thrown by Hess on the question as to whether what we recognize as Vitamin D is really a vitamin. It is quite possible that there is an unknown factor in the etiology of rickets not as yet discovered.

VIOSTEROL

By far the most potent specific for rickets is irradiated ergosterol. This drug has been known to have marked antirachitic properties for about six years. Its discovery was made during investigations on cholesterol, which was first thought to contain the antirachitic factor. Investigations in chemical and clinical laboratories led to the recognition of ergosterol as a precursor of the antirachitic vitamin. Ergosterol has been known to be a derivative of ergot and fungi, but nothing was known as to its distribution in the skin and other tissues. When this was recognized it was already known that it could be activated by a small intensity of ultra-violet radiations.

The recommended dosage of irradiated ergosterol has undergone great variations during the few years it has been available for clinical use. This is due to the lack of standardization. The potency of the viosterol now on the market as authorized by the Wisconsin Alumni Research Foundation is 250D. The most comprehensive and practical work on the dosage of viosterol was done by Julius H. Hess[11] and his associates. His observations were made with viosterol 100D except his studies on the effect of massive doses when potencies up to 1000 D were used.

It is difficult to give exact rules for the optimal dose of viosterol 250 D. It may be safely stated, however, that freedom from rickets can be expected if an infant gaining at a normal rate is given from 8 to 10 drops daily, provided the drug is started during the first weeks of life. Premature and rapidly gaining infants must be given larger doses. May[12] suggests that 30 to 60 drops of 100 D (18 to 24 drops of 250 D) is "an effective range for the prevention of rickets in premature infants."

For the care of mild cases of rickets, 15 drops daily should be sufficient. Cases of moderate degree will require 20 drops daily. For the florid cases now rarely seen, larger doses may be required. Results may be obtained if the maximum doses are given only a few times a week. Because of the possibility of toxic symptoms developing it may be well when exceptionally large doses are given to control the medication by occasional estimation of the calcium and inorganic phosphorus of the blood.

ULTRA-VIOLET RADIATIONS

Ultra-violet radiations (290 to 313 millimicrons), a reliable and potent specific for rickets, is associated with the names Huldschinsky[13] and Rollier.[14] The latter was the first to make a definite statement to the effect that sun was the treatment of choice in the cure of rickets. The results are due to a photochemical reaction upon a definite chemical substance. This substance produces among other changes a calcification of the epiphyses easily demonstrated by roentgenograms. The effect on metabolism as demonstrated by Orr,[15] Holt and their colleagues is an increased retention of calcium and phosphorus.

Ultra-violet radiations are obtainable from direct exposure to the sun's rays and from artificial sources such as air-cooled mercury vapor lamps and the arc lamps.

When heliotherapy is the treatment of choice some consideration as to the number of hours of available sunlight is necessary, as well as an estimation of the quality and intensity of the rays. Unfortunately during the winter months, the period when heliotherapy is most needed, the relation between the sun and the earth is such that only a small part of the desirable band of rays is available. The short rays do not reach the earth and the longer ones are diminished in intensity. Moisture (fog), smoke, and dust act as filters. Rays reflected by water or snow and sky shine are valuable. Sky shine has been estimated by Tisdale and Brown[16] as being from one-half to two-thirds as effective as sunshine.

Solar rays when available produce different effects from the more accurately controlled

radiations from artificial sources. Clinically this is shown on the skin by ruddier color, an increase of elasticity, an improved texture and a firmer connection with the subcutaneous tissue. The muscles show increased turgor and bony changes (particularly craniotabes) show rapid healing. The roentgenograms are again the most important criteria of progress.

The technic depends upon the month of the year and is wholly empiric not only as to the length of exposure but also as to the amount of skin exposed. It is to be remembered that some of the spontaneous cures of rickets occurring in the spring are in babies who are out of doors a comparatively short time and have only their face and possibly their hands exposed. Our method beginning as early in the spring as the weather will permit is as follows: The legs are exposed for a period of 15 minutes. The following day the legs are again exposed for the same period and then in addition the thighs uncovered for 15 minutes. On the third day this procedure is repeated and an additional 15 minutes of exposure is given to the lower abdomen and buttocks. This method is followed until the entire body has been exposed, unless contraindications develop. Over-exposure is usually followed by pallor and fever. The skin of infants varies widely as regards the amount of radiations that can be tolerated without producing the very slight flushing that is desirable. It is well known that blondes are far more sensitive to the ultra-violet rays than are brunettes but there are exceptions to this rule. Caution must be exercised at the beginning of the treatment. The mothers should be advised that the tan resulting from ultra-violet rays is not the object of the exposures.

Ultra-violet rays produced artificially are much more easily controlled and much more available in this vicinity than the solar rays. The rays from the carbon arc lamp more nearly approach the solar rays but unfortunately the apparatus has many practical drawbacks. The mercury vapor light gives a ray of shorter wave lengths than the sun.

The treatment here again is empirical and the same caution is to be used as with solar radiation. Our technic is as follows: The exposures are given to the entire body at a distance of 27 inches. The first exposure is for one minute anteriorly and posteriorly. On the third day the exposure is lengthened to two minutes, if there are no contraindications. The exposures are increased one minute every second day until the child is getting seven minutes anteriorly and posteriorly. It is usually possible in this way to give approximately an hour of ultra-violet radiations in two weeks. The usual precautions are taken to prevent injury to the eyes.

The effect is as remarkable and is as easily demonstrated as with the other specifics. Within two weeks new calcification in the epiphyses and carpal centers is demonstrable with the roentgenograms. Clinical improvement is also readily demonstrable.

Hess emphasizes the fact that neither radiations from sun nor from artificial sources produces an indefinite immunity. Attacks of recurrent rickets may develop later in spite of a thorough course of irradiation.

The dosage of the several specifics has been discussed on the premises that each was to be used alone. Such a course is rarely advisable. For example in one case the frequency of upper respiratory tract infections occurring as a complication of the rickets may suggest the use of cod liver oil in order to gain the benefits of Vitamin A but a digestive disturbance may prevent adequate dosage. It may then be advisable to increase the potency of the oil by adding viosterol. Anemia may suggest another combination of specifics, particularly one which includes ultra-violet radiations. Other complications will demand various combinations of the specifics.

Enthusiasm over the results obtained from one tried specific must not permit us to ignore the benefits that can be obtained from other measures. Rarely is it advisable to adhere to one specific in the treatment of any given case. In no instance must our enthusiasm over the treatment of the rickets allow us to overlook the welfare of the patient.

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THE RELIEF OF PAIN IN ADVANCED TUBERCULOSIS OF THE LARYNX BY MEANS OF SURGERY*

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THE relief of pain on swallowing is of the utmost importance in the treatment of laryngeal tuberculosis, because as a consequence of pain, there is a diminished intake of food, leading to the rapid failing of the patient. In the past eighteen months, I have had the opportunity of bisecting the internal branch of the superior laryngeal nerve five times, at Glen Lake Sanatorium, for the relief of the dysphagia. The object of this discussion is to call attention to the symptomatic value of resection of the superior laryngeal nerve in far-advanced tuberculosis of the larynx. What the value of this procedure has in the cure of tuberculosis of the larynx must be left for further observation.

CLINICAL APPLICATION

Application of various remedies to the larynx for dysphagia has never been satisfactory. It gives relief for only a short time or sometimes does not help at all and must be repeated too often. This type of treatment would be applicable only where there are small ulcers.

The injection of alcohol into the superior laryngeal nerve, to relieve the pain in tuberculosis of the larynx, as introduced by Hoffmann, has been frequently resorted to. There are many objections to this method. The success of the injections naturally varies with the skill of the operator, and when relief from pain is gained, the duration of the anesthesia fluctuates from a few hours to two months. If it becomes necessary to repeat the injection, it is found that after the first injection all subsequent injections are less likely to be successful, probably because of the development of connective tissue adhesions. Again it has been noted that at times the pain reappears with greater severity after the injection of alcohol. Another disadvantage to the injection of alcohol into the superior laryngeal nerve, worthy of mention, is the possibility of paralysis of the tongue. This is due to the effect of the alcohol extending into the closely related hypoglossal nerve (Fig. 3).

However, the bisection of the internal branch of the superior laryngeal nerve for the dysphagia of tuberculosis of the larynx has many advantages. The surgeon should perform this simple

*Presented before the meeting of the Minnesota Academy of Medicine, October 14, 1931.

operation when nourishment becomes impossible, on account of dysphagia, because it presents no technical difficulties and is the surest method of removing dysphagia in patients afflicted with laryngeal tuberculosis. The operation has hardly any contraindications.

The internal branch of the superior laryngeal nerve, besides furnishing the sensory fibers to the mucous membrane of the larynx, also furnishes motor branches to the interarytenoid muscles (Fig. 1). This muscle assists in the approximation of the posterior half of the vocal

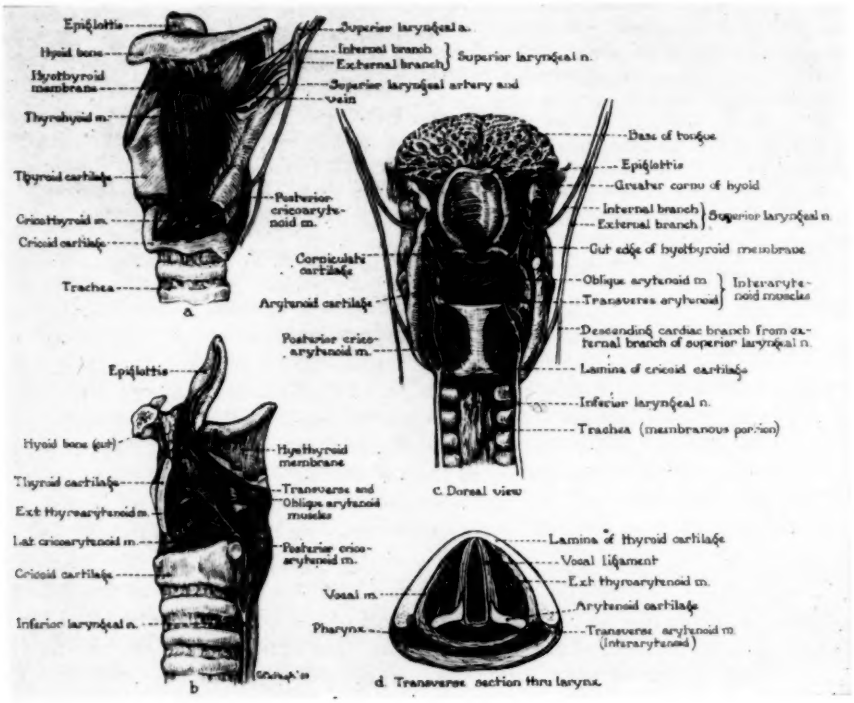

Fig. 1. Dissection of the larynx to show the intrinsic muscles and distribution of the laryngeal nerves. Note muscular distribution of internal branch of superior laryngeal nerve. (Modified from Jackson.)

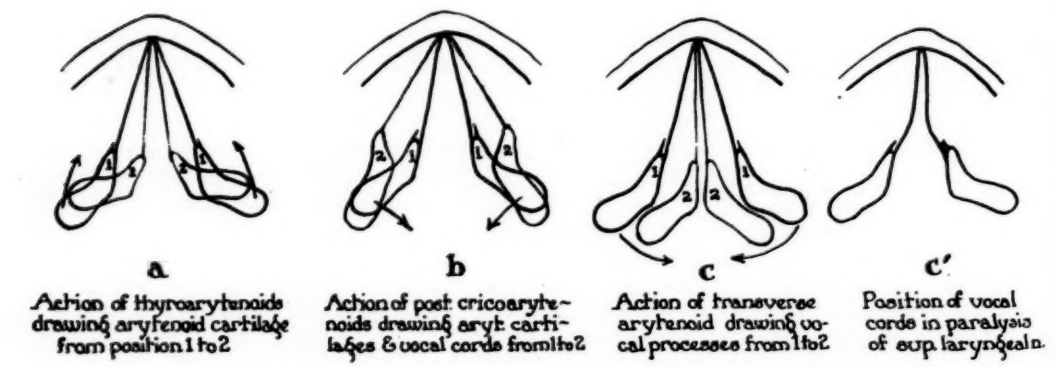
a
Action of thyroarytenoids drawing arytenoid cartilage from position 1 to 2
b
Action of post. cricoarytenoids drawing aryt. cartilages & vocal cords from 1 to 2
c
Action of transverse arytenoid drawing vocal processes from 1 to 2
c'
Position of vocal cords in paralysis of sup. laryngeal n.

Fig. 2. Action of the laryngeal muscles. *A*, Action of thyro-arytenoids drawing arytenoid cartilage from position 1 to 2. *B*, Action of posterior crico-arytenoids drawing arytenoid cartilages and vocal cords from 1 to 2. *C*, Action of transverse arytenoid drawing vocal processes from 1 to 2. *C'*, Position of vocal cords in paralysis of superior laryngeal nerve. (Modified from Jackson.)

cords. Therefore, the bisection of the superior laryngeal nerve in the treatment of far-advanced tuberculosis of the larynx has a distinct advantage over other methods, in that it assists in the carrying out of two of the basic principles in the treatment of tuberculosis, namely, that the distributed mainly to the cricothyroid muscle, which tightens the cords. The internal branch passes medially and enters the larynx through the thyrohyoid membrane. It furnishes sensory fibers to the mucous membrane of the larynx as well as motor fibers to the interarytenoid muscle.

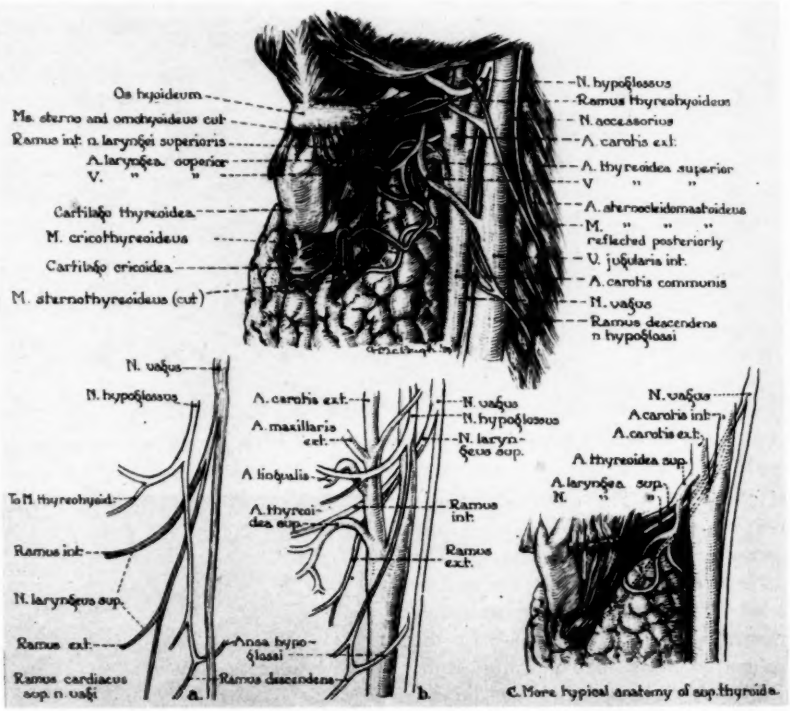

Fig. 3. Dissection to show the extralaryngeal relations of the superior laryngeal nerve. (Nordland.)

patient is able to take the proper amount of nourishment, because of the relief from the severe pain of swallowing, and second, because the vocal cords are partially immobilized through the paralysis of the interarytenoid muscles (Fig. 2).

THE ANATOMICAL CONSIDERATION

The object is to expose and bisect the nerve at the most favorable point. For this purpose, it is best to select the course along the hyothyroid membrane. The superior laryngeal nerve arises from the ganglion nodosum of the vagus (Figs. 1 and 3), and, after a short course, divides into two branches, a small external and a large internal branch. The external branch passes downward and mesialward and is finally It occasionally gives off an anastomotic branch to the recurrent laryngeal nerve. The superior laryngeal nerve from its origin lies parallel to and in close proximity with the superior thyroid artery and its branches. The surgical importance of this fact will be referred to later. In the region of the hyothyroid membrane, the nerve is covered by the stratification of the sternohyoid, omohyoid and thyrohyoid muscles.

THE OPERATION

The instruments are the same as those used for the ligature of the superior thyroid artery. The patient is placed in the same position as for thyroidectomy. A few c.c. of 2 per cent solution of novocain are injected subcutaneously at the site for the intended incision. An incision

6 to 7 cm. long parallel to the hyoid bone is made, which extends midway between it and the upper margin of the thyroid cartilage, across the border of the sternomastoid muscle. After dividing the skin, platysma and fascia, the anterior border of the sternomastoid muscle is freed

After the operation, all painful sensation upon swallowing food disappears immediately. When pain persists after resection of the superior laryngeal nerve, it can be assumed that the ulceration is not confined to the larynx.

In all of our cases, the dysphagia was relieved

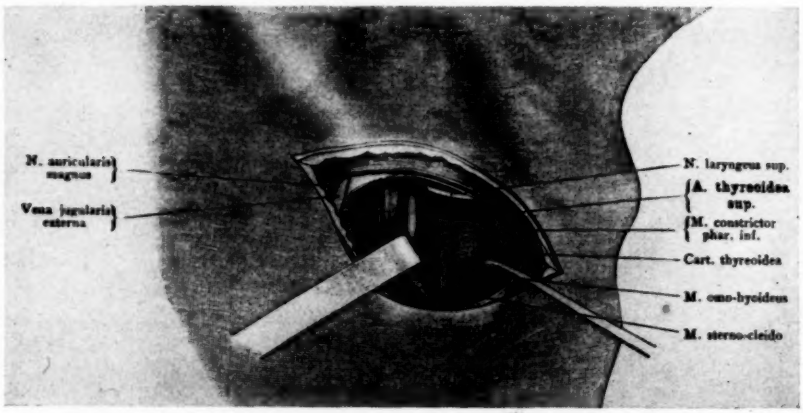

Fig. 4. The incision for the bisection of the internal branch of the superior laryngeal nerve.

and retracted (Fig. 4). The external jugular vein and great auricular nerve are carefully avoided in the posterior part of the wound. The omohyoid muscle, coming from under the sternomastoid muscle, is then freed along its outer border and drawn inward. If the loop of the superior thyroid artery has not come into view, the large anterior branch between the larynx and the upper pole of the gland serves as a guide. By following this guide, we find the main trunk of the artery lying on the outer surface of the inferior constrictor of the pharynx with the superior laryngeal nerve situated only a little higher up.

Valuable time should not be lost in the application of other methods which will give only temporary relief. Because of the simplicity of the operation and in order to avoid a repetition of the operation on the other side, Wachmann advises that a bilateral operation be made in the first place. Two of our patients had a bilateral operation without the slightest secondary effects. Wachmann, who reported a series of cases in 1916, in which he performed bilateral resection, noticed no trophic disturbances as the result of the resection of both nerves. The wound heals rapidly and does not leave a disfiguring scar (Fig. 5).

Fig. 5. Case 3. Small scar, four weeks after operation.

immediately. In the two cases in which bilateral bisection of the nerve was made, the patients were so much improved after the first procedure that they asked to have the second side operated upon.

CASE REPORTS

Case 1.—Was that of a young man with far-advanced tuberculosis complicated by tuberculous laryngitis. The prognosis was unfavorable.

Larynx.—1. Hoarseness marked commencing January 1, 1930, progressively worse. Throat very sore. Pain on talking and swallowing. 2. Epiglottis de-

stroyed (50 per cent). 3. Left arytenoids three times as large as right, red and inflamed. 4. Pus in posterior half of larynx. 5. True cords thickened, infiltrated and injected.

Operation.—Bisection of right internal branch of superior laryngeal nerve on April 26, 1930.

Result of operation.—Pain on swallowing much relieved. However, appetite very poor on account of general condition and therefore unable to take much nourishment. Also had many stomach symptoms which prevented eating.

Case 2.—Was that of a young woman with far-advanced tuberculosis complicated by tuberculous laryngitis. Hoarseness and occasional soreness of the throat developed early in 1930, soon after the onset of the disease. Within a month, the severe dysphagia became persistent, causing inability to eat.

Larynx.—1. Epiglottis swollen and reddened. 2. Both arytenoids swollen and inflamed. 3. Extensive ulceration right arytenoid extending into posterior commissure. 4. Right true cord pale.

Operation.—Section of right internal branch of superior laryngeal nerve on April 23, 1931. Section of left internal branch of superior laryngeal nerve on July 10, 1931.

Results of operation.—Operation on each side was followed by immediate relief from pain and marked improvement in appetite.

Case 3.—Was that of a young woman with a diagnosis of far-advanced pulmonary tuberculosis complicated by laryngitis. She had burning and soreness in her throat since 1927. Pain became gradually so severe that by May, 1931, she could not eat.

Larynx.—1. Marked bilateral soreness with pain on swallowing. Unable to eat. 2. Epiglottis three times normal size covered with white plaques. 3. Arytenoids markedly enlarged. 4. Small tuberculoma posterior commissure.

Operation.—Section internal branch of right superior laryngeal nerve on July 23, 1931. Section internal branch of left superior laryngeal nerve on August 25, 1931.

Results of operation.—Operation on right side—Immediate marked relief of all symptoms on right side of larynx. No pain on right side. Able to eat much better. Pain on left side of throat. Operation on left side—Immediate marked relief of all symptoms.

CONCLUSIONS

The resection of the superior laryngeal nerve is the surest method of removing dysphagia in patients afflicted with laryngeal tuberculosis.

The operation presents no technical difficulties and does not cause any severe secondary phenomena.

The operation can be done primarily on both sides and is easily borne by the patient.

The operation has a definite symptomatic value and may have a curative possibility.

The operation is suitable for other painful inflammatory processes in the larynx.

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THE TESTICULAR HORMONE

Experimental and clinical evidence, as well as numerous studies of transplantations, indicates clearly that the testes possess one or more endocrine functions. In the past the criteria used for determining the effects of the extracts on castrated animals were of doubtful value but more trustworthy methods have been elaborated. While the exact chemical nature of the hormone is not known, some of the chemical properties have been determined. The most active and probably purest preparation thus far obtained is one in which a dose of 0.01 mg. of the active material per capon daily causes distinct comb growth. The product acts best when injected subcutaneously or intramuscularly; the dose for action by mouth is at least ten times as high. Thus far there has been no indication that the product can be of any value in restoring "vigor" to the aged or neurasthenic. However, if there is an indication for its use and if the dosage in man is comparable to that effective in the capon, the daily injection for a man weighing 150 pounds would have to be an amount equivalent to 5 pounds of bull's testis or 2 gallons or normal male urine. If taken by mouth, the dosage presumably would have to be much larger. (Jour. A. M. A., February 27, 1932, p. 738.)

MUCOCELE OF THE APPENDIX WITH REPORT OF A CASE*

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SINCE Virchow, in 1863, first recognized cystic dilatation of the appendix, between 160 and 170 verified cases have been reported in the literature. Virchow considered this condition to be one of colloid degeneration. Rokitansky, in 1867, described four appendiceal cysts which he considered examples of colloid carcinoma, and, in 1877, Ferē first designated this pathologic entity as mucocele. Castle, in 1915, reported from the literature twenty-nine cases in a total of 13,158 records of postmortem examinations. Dodge, in 1916, after an exhaustive review of the literature, found reports of 142 cases. Of these, fifty-five were reported from necropsy, sixty-six from operation, and in twenty-one cases information as to how the study was made was not recorded or was not accessible. Davison, in 1922, added eighteen reports which he had found, together with a report of a case of his own. Since that time there have been reports of cases by Milliken and Poindexter, Weaver, Meyers, Nash, and others.

The following report is a review of the operative cases of mucocele of the appendix seen at The Mayo Clinic from 1917 to 1930, inclusive. During this time out of a total of 31,200 cases in which appendectomy was performed, there were seventy-six pathologically proved cases of mucocele. An attempt has been made to analyze the symptoms, physical findings and associated pathologic characteristics. Six cases, reported by Masson and Hamrick in 1930, were not included in this survey, leaving seventy for consideration.

Thirty-one of the patients were males and thirty-nine, females, and their ages varied from fifteen to sixty-five years, with an average of forty-two and a half years. Analysis of the laboratory work gave very little information. Studies of the blood and urinalysis were made as a routine in all cases. The number of leukocytes varied between 3,800 and 12,100 in each cubic millimeter of blood, with an average count of 7,675 for the entire group. There were no urinary findings of significance in the seventy cases. In eleven cases, analysis of gastric content was made, with variations in the total acids, in terms of cubic centimeters of tenth normal sodium hydroxide, of 70 to 6, and of free hydrochloric acid of 54 to 0.

Twenty-eight of the total number of cases were not associated with any other pathologic condition. All of these twenty-eight patients gave histories of attacks of distress in the right lower abdominal quadrant, varying from a number of years to a few days. In the greater percentage, physical examinations revealed tenderness in this region. In ten of the cases there was an operative diagnosis of acute appendicitis; in five of this number there was preoperative rupture, and in three appendiceal abscess had formed. Two of the patients with abscess had been operated on again within sixty days of the original drainage, and the mucocele was identified at this operation. Forty-two of the total number of patients were operated on for associated pathologic conditions, and, in each case, the symptoms were that of the major condition. Five of these patients gave additional histories of distress in the right lower abdominal quadrant, sufficient to arouse suspicion of recurrent appendicitis. In fourteen of these forty-two cases the condition was associated with cholecystic disease; in twelve, stones were present. There were twelve cases of duodenal ulcer, and two cases of gastric ulcer. One case was identified when the appendix was removed in the course of repair of a postoperative ventral hernia, and another was associated with a perforating carcinoma of the sigmoid.

From this review it would seem that the most significant physical finding, besides the tenderness on pressure in the right lower abdominal quadrant, was a palpable mass in this region. Fourteen patients had a palpable mass in the right lower abdominal quadrant, in seven of which it was proved, at operation, to be due to the mucocele. In the other cases, the mass was due to associated pelvic pathologic conditions. In none of these fourteen cases was a preoperative diagnosis made or suggested. Many cases have been reported in which there was error in

*From the Section on Surgery, The Mayo Clinic, Rochester, Minnesota. Submitted for publication October 19, 1931.

diagnosis; the tumefaction in the right lower abdominal quadrant has been mistaken for ovarian cyst, floating kidney, pedunculated uterine fibroid tumor or a malignant condition of the small or large bowel.

The majority of those who have studied this condition believe the following to be the facts that are involved in the formation of mucocele: There must be complete, or almost complete, obliteration of the lumen of the appendix. This must be associated with an actively secreting mucous membrane, secreting mucus in excess of absorption, and with some change in the mucosa whereby the normal mucus is changed into pseudomucin. This change should take place in an aseptic field; otherwise, empyema or gangrene would result.

Fig. 1. Section obtained in study of the case reported in this paper. A single layer of tall, columnar epithelium is replacing the normal mucosa.

Microscopically, in the cases we have seen, there has been a change in the height of the mucus-producing cells. Associated with this there is a gradual reduction in number, and the larger the growth, the greater the destruction of the cells. Wellbrock's opinion is that the possibility of this growth being the precursor of colloid carcinoma of the appendix should be considered. Such a growth may be primary, comparable to relatively benign tumors of other parts of the body. That some doubt as to the theory of formation should be entertained is shown by the fact that the number of cases of mucocele of the appendix, in contrast with the number of cases in which the appendixes present obliterated lumens, is very small (Fig. 1).

The most interesting complication of mucocele of the appendix is rupture, with the resulting formation of pseudomyxoma peritonæi. This condition is analogous to that which occurs from ruptured pseudomucinous ovarian cyst, which may be benign or malignant. Masson and Hamrick, following their study of six such cases complicated by rupture, came to the conclusion that the prognosis in pseudomyxoma peritonæi of appendiceal origin is better than in that of ovarian origin; this is due largely to the fact that the exudate, in its escape from the appendix, may be limited to the right iliac fossa.

Fig. 2. The mucocele of the appendix in the case reported.

The prognosis in uncomplicated cases is good. There were no deaths in any of our series, and the mortality rate is that of simple appendectomy.

The following is a report of a recent case of mucocele of the appendix in which operation was performed at the clinic.

REPORT OF A CASE

A man, aged sixty-six years, came complaining of failing vision. His general health had always been good except for a tendency to be habitually constipated. For six years previous to his admission he had known of an asymptomatic mass in the right lower abdominal quadrant. Physical examination was negative except for discovery of this mass. A roentgenogram of the colon disclosed an extracecal mass in the angle between the terminal portion of the ileum and the cecum. Urinalysis gave negative results; the concentration of hemoglobin was 12.3 gm. in each 100 c.c. of blood, and leukocytes numbered 5,400 in each cubic millimeter of blood. Operation was advised, and, under spinal anesthesia, a large mucocele of the appendix, resembling in shape a stubby banana, was removed. The specimen was a mucocele, 11 by 4 by 4 cm. (Fig. 2) in various dimensions. In the wall, which was thickened, there was marked fibrosis and hyalinization, with some deposit of calcium. The mucosa was replaced by a single layer of columnar epithelium; the submucosa

and muscularis were one continuous mass of fibrous, hyaline tissue containing scattered and collected lymphocytes. The patient's convalescence was uneventful and he was dismissed as cured in fourteen days.

SUMMARY

Seventy cases of mucocele of the appendix are reviewed. In this clinical analysis no definite diagnostic point has been revealed. The most significant facts are the history of distress and palpable mass in the right lower abdominal quadrant. With this present, mucocele of the appendix should always be considered. In uncomplicated cases, the condition is relatively benign. Although mucocele may be a primary type of malignant tumor, its growth is exceedingly slow, and complicating factors are rare. Rupture of larger mucoceles frequently results in the formation of pseudomyxoma peritonæi. The treatment of the uncomplicated case is appendectomy, and the prognosis is good.

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SYNTHALIN

No preparations given orally are of proved value in the treatment of diabetes. Synthalin, which has been given the most extensive trial, does seem to be beneficial in an occasional case, but Synthalin is far from being nontoxic and in some patients it produces liver damage. It seems best at present to use insulin and nothing else. (Jour. A. M. A., February 13, 1932, p. 573.)

CASE REPORT

CARCINOMA OF THE LUNG*

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A white male laborer, fifty years of age, presented himself to the Wisconsin General Hospital complaining of weakness. His disability began fifteen months previously with a "grippy" attack and at that time he had been told that there was considerable congestion of the right lung. Within a period of two weeks he recovered sufficiently to return to work, a weight loss of 15 pounds having occurred during the period of bedfastness. His strength was not regained, and from time to time he was forced to give up his work. Weakness was the outstanding complaint. Constipation and gaseous distention supervened.

Eleven months after the acute onset of symptoms a new position was obtained with lighter duties occupying him nine hours a day. The fatigue was still so oppressive that he could scarcely walk home in the evening. His appetite failed. After six weeks he became so fatigued that he quit work and stayed in bed for a week. The physician, consulted at the end of this period, determined a fluid accumulation in the right pleural cavity. Three quarts of a reddish tinged fluid were withdrawn and pronounced negative to tuberculosis by laboratory studies. On two subsequent occasions thoracenteses obtained 16 and 6 ounces, respectively, of a clear straw colored fluid.

The inventory by systems established the rapid development of a large nodule on the head over a period of seven months. A febrile reaction ranging to 100° F. had been noted on frequent occasions since the onset. Palpitation occurred occasionally after heavy meals. Dyspnea had progressed over the past five months. A weight loss of 25 pounds had been noted in the past fifteen months.

The past medical history included the usual diseases of childhood. There was an attack of scarlet fever at one year of age, pneumonia at twenty and frequent respiratory infections. A serious laceration to the lateral side of the left knee from a logging hook twenty-five years previously had resulted in a suppurative arthritis with subsequent ankylosis of the knee joint.

The social history was irrelevant, but the family history elicited the occurrence of a neoplasm (probably carcinoma) in the paternal grandmother, tuberculosis in a paternal uncle and a cousin, and insanity in the paternal grandfather and uncle. The contact with the tuberculous relatives had been problematic.

The physical examination developed the following pertinent findings:

Emaciation. A firm nodule, 4 × 6 cm., in the right fronto-parietal region. Perforation in the anterior por-

*From the Department of Medicine, University of Wisconsin Medical School. Presented before the Mississippi Valley Conference, St. Paul, September 21-23, 1931.

tion of the bony nasal septum. Diffuse enlargement of the thyroid gland.

Right shoulder lower than left; retraction of the right supra- and infra-clavicular spaces; narrowing of the interspaces on the right; total absence of respiratory excursion at the right apex with gross decrease at the base; tactile fremitus, resonance, breath sounds and voice sounds decreased to absence on the right side except for a small zone above the third rib anteriorly where the breath sounds were almost amphoric and the voice sounds, egophonous; compensatory hyperresonance and exaggerated breath and voice sounds on the left. (The pitch and quality of the percussion note changed from woodeny tympany in the recumbent position to dullness in the upright posture over the second and third right interspaces. No bell tympany, succussion splash nor metallic tinkle were demonstrable over this area; but two days later a typical bell tympany was elicited to the coin test over the third to fifth interspaces on the right.)

Heart displaced to the left.

Left knee fixed in 25° flexion with considerable increase in circumference. Attendant atrophy of left thigh and leg.

In evaluating the physical findings the staff concurred in the opinion of an irregularly pocketed hydropneumothorax; but the history of its course gave much food for thought and discussion. The family history of tuberculosis and the patient's suppurative arthritis were given due attention. The mode of onset was voted suggestive for tuberculosis. Weight loss was an equivocal factor. Had the pleural fluid been serosanguinous on all occasions rather than on a single aspiration, the differentiation would have been simplified. Importantly, cough and sputum had been singularly missing from the picture. Accordingly the laboratory was called upon for assistance.

Important among these findings were the persistent chlorotic type of anemia (4.7 millions erythrocytes with 50 per cent hemoglobin) and the negative sputa. A polymorphonuclear leukocytosis (10,150 to 14,950 with 84 to 93 per cent neutrophiles) pertained. The blood Wassermann reaction was negative. The roentgenogram of the skull revealed a bony defect beneath the site of the visible nodule. The stereoscopic roentgenograms of the chest (Fig. 1) showed the following details: Trachea was visualized in the midline. The right vertebral, first and second interspace distributions showed some fibrous thickening and there was a granular increase in density in the left first interspace. The radiolucency on the right was greatly decreased and a cascading series of horizontal fluid levels with elliptical zones of rarefaction above each was observed at various levels in the right thorax. The opacity of the right lung field obscured the right border of the heart, the mediastinum and the diaphragm.

While the persistently negative sputa argued against diagnosis of pulmonary tuberculosis, the first directional support for a neoplasm of the lung came in the roentgenologic evidence of a bony defect beneath the parietal nodule, which continued to increase in size after the patient's entrance to the hospital. Not until the twentieth day after admission did the opportunity for a biopsy present itself in a small firm nodule in the right pectoral chain of lymphatics. (The surgeons had advised against section of the cranial nodule.) The sections of this node were diagnosed carcinoma.

The clinical course during the period of hospitalization

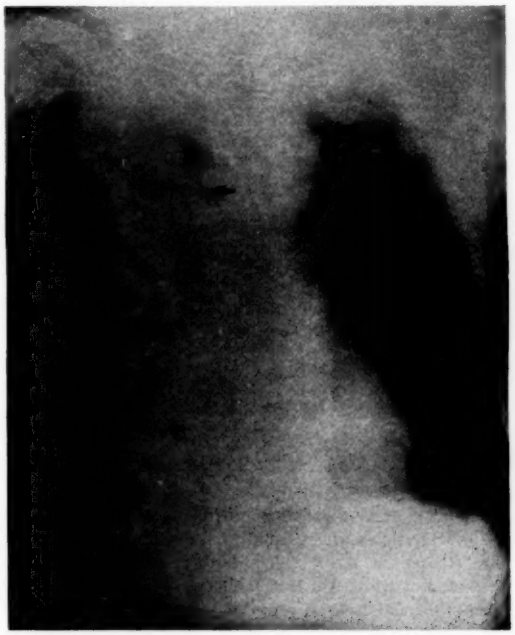

Fig. 1. Roentgenogram of chest. Arrows indicate several fluid levels.

was marked by steady weight loss, recurrent accumulations of serous and later sero-sanguinous fluid in the right pleural cavity, afternoon fever ranging from 99.4 to 101.2° F. and extreme dyspnea. Very late in the course of the disease there were several small hemoptyses. The patient died on the fifty-third day after entrance.

The postmortem examination as reported by Dr. Gorton Ritchie was especially interesting in the details related to the primary neoplasm and its metastases. The right lung was found to be totally collapsed with a dense pleural covering, cartilaginous in consistency. The lung substance was atelectatic, doughy, greyish green in color with numerous strands of white tissue, cartilaginous to the knife, extending throughout the same. These white trabeculæ were especially prominent at the lines of the interlobar septa. The bronchi were considerably stenosed and the tracheo-bronchial nodes were involved in a mass of this cartilage-like tissue. At the base of the right lung was a large mass of firm, elastic tissue involving the whole right leaf of the diaphragm. This tumor was densely adherent to the body wall in all directions and the diaphragm beneath was 1.5 cm. thick.

The liver contained numerous umbilicated light col-

ored nodules; and on section the exposed surfaces of all portions of the organ were studded with many firm white nodules. These were contrasted with the congestion of the remainder of the surface.

The histological study of the tumor and metastases in the liver and bronchial lymph nodes showed an

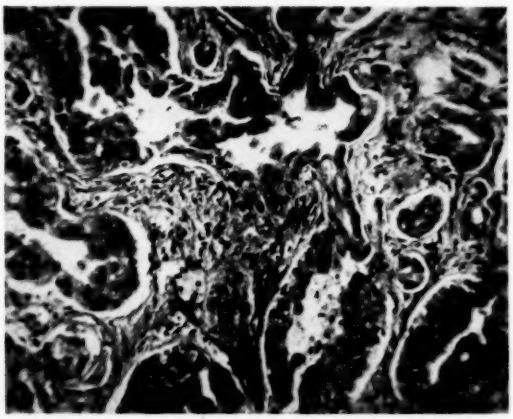

Fig. 2. Photomicrograph of histologic section of carcinoma. Courtesy Dr. Gorton Ritchie.

alveolar type of atypical epithelial growth in the main (Fig. 2). There was a small amount of connective tissue stroma in the same. Many tumor cells showed vacuolation and degenerative changes in the nuclei. In places there appeared a dense overgrowth of fibrous connective tissue. There was some bone formation. Very importantly some portions appeared to have been derived from bronchial epithelium.

This patient well illustrates many of the difficulties presented in arriving at a differential diagnosis between primary carcinoma and tuberculosis of the lung. Pleurisy with effusion, weakness, weight loss, afternoon fever and chest signs, particularly in a patient with a history suggestive of exposure to tuberculosis and a definite antecedent suppurative arthritis might well arouse the suspicion of a tuberculous background. The occurrence of a serosanguinous effusion favored neoplasm. The absence of a cough, persistently negative sputa and conspicuous dyspnea also pointed toward this conclusion. It remained for the laboratory to suggest the diagnosis in the lead afforded by the cranial defect and to clinch the same in biopsy findings on the lymph node from the pectoral chain. Interestingly, histologic studies of materials obtained at necropsy indicated that the carcinoma of the lung was of the rarest type, alveolar-celled. Carcinomata from the bronchial mucous glands and from the bronchial epithelium are more common. Objection was raised at the time of the biopsy report to the suggestion of a bronchial origin. As a rule such cases have persistent cough and blood streaking of the scanty sputum as relatively early symptoms, whereas in this case cough was never a volunteered symptom and small hemoptyses occurred very late in the course. It is difficult to account for the absence of pain in this case unless it resulted from the stoicism of the patient.

The symptoms of carcinoma of the lung vary widely with the nature of the lesion, its location and direction of extension, encroachment upon the lumina of bronchi or surrounding structures, pleural involvement and metastastic routes. In the present relation, time is not afforded to discuss this matter in any detail. Whenever the question of the differentiation between primary carcinoma and tuberculosis of the lung arises, the clinician must bear in mind the frequency with which cardinal symptoms of tuberculosis, persistent cough, hemoptysis, fever, pain, dyspnea and weight loss are seen in carcinoma of the lung. In qualification it should be stated that the pain of neoplastic infiltration is rarely pleuritic. It may be sharp or dull, but rarely does it have the same relation to respiration as does pain in tuberculosis. Dyspnea is far more common and distressing in carcinoma than in tuberculosis. The question of fever in carcinoma of the lung is an interesting one. Professor Riesman has for many years taught that not only is carcinoma of the lung the tumor most frequently attended by fever but also that fever should suggest rather than refute such a diagnosis. In the experience at the Wisconsin General Hospital necrosis is a more common explanation for this febrile reaction than infection.

The physical findings of primary carcinoma of the lung may be negligible or absent for a considerable period of time. If present, several factors modify them, namely accessibility, bronchial encroachment and pleural involvement (with or without effusion). Since the bronchogenic type of carcinoma (mucous glandular and epithelial) occurs much more frequently than the alveolar form, particular attention should be paid to alterations in the aeration and vibratory phenomena of the several lobes of the lungs of patients in whom the suspicion of pulmonary tuberculosis can not be confirmed by ordinary laboratory measures.

In the hands of qualified experts bronchoscopy offers the greatest promise of success in the diagnosis of carcinoma of the lung, especially of the bronchogenic order. The direct visualization of the lesion is possibly less useful and certainly less convincing to the general practitioner than the biopsy materials so obtained. The roentgenogram is helpful in a certain proportion of cases. In the general hospital this aid is not as widely applicable as one might judge theoretically. The wedge or triangular shaped infiltration, base to hilum and apex to periphery, should suggest this lesion in the majority of instances of bronchogenic carcinoma seen before wide extension or pleural involvement has masked the picture. The unilateral solitary nodule or mass in the lung field may by progress studies be definitely defined as a neoplasm, but abscess, gumma, infarct and other conditions must enter into the consideration for differentiation. The metastases to accessible lymph nodes frequently afford a fortunate diagnostic aid to the hard-put clinician. Not uncommonly these metastases in the immediate supraclavicular, axillary and pectoral nodes are very small and inconspicuous. Where the thought of a primary carcinoma of the lung

is entertained, particular search should be made for these invaluable guides.

In so far as the diagnostic results are concerned, the experience at the Wisconsin General Hospital is probably a fair criterion for similar institutions in this direction. Over a period of six years the diagnosis of primary carcinoma of the lung has been made twelve times. In this group eight were males and four females. Eight were of bronchogenic origin and two, alveolar-celled. The histologic returns are not available on the remaining two. Necropsies were performed upon eight of the series, and in two of this group the diagnosis was thus made for the first time. In one of these individuals a clinical diagnosis of tertiary syphilis had been made, while in the second the bilateral distribution of the primary carcinoma of the lung had proved misleading.

In analyzing the aids to the correct diagnosis in ten of twelve cases at the Wisconsin General Hospital, the clinical course and the physical findings were helpful in a majority. Biopsy of accessible nodes concluded the diagnosis after suspicion had been aroused in six of the ten positive antemortem diagnoses. A diagnosis by bronchoscopy was afforded in only one instance. Roentgenologic study gave the first clue in three subjects. Accordingly it may be concluded that no single factor in the diagnosis of primary carcinoma of the lung may be stressed to the exclusion of others. Only by attention to the details of the history and clinical course supported by every available measure of physical and laboratory diagnosis may a fair percentage of these cases be diagnosed antemortem. Considerable stress has been placed upon the utility of biopsy studies of accessible lymph nodes in clinching the diagnosis. Of course such implants represent metastases and in so far as therapy is concerned, a stage beyond recall of present measures of treatment. If eradication is to be effected, earlier diagnoses must be made; and the roentgenogram and bronchoscopic study offer the greatest promise in this direction.

OVERSUPPLY OF TRAINED NURSES

Training schools must curtail the steady production of more nurses or the morale of the nursing profession will break down completely. This is the opinion of the Committee on the Grading of Nursing Schools, following an analysis of early returns of the 1930 census on workers.

How serious the oversupply of graduate nurses has become is revealed by the Grading Committee after tabulating figures for eighteen states and the District of Columbia. For this group, since the 1929 census, the total population has increased 7 per cent, while the total number of trained nurses has increased 78 per cent.

Although there are still areas of the country and groups of patients not properly nursed, owing to poor distribution and lack of special training, the figures for the forty-two cities studied show that the average nurse has no more than 149 days of employment in any given year, according to the present sickness rate. In Bangor, Maine, she has not more than 77 days of work, and in Ottumwa, Iowa, where employment conditions are best among the cities studied, she can work not more than 201 days in the year. Rates for the other cities range between these two.

States as a whole are somewhat less oversupplied with nurses, although in New Hampshire the nurse can expect no more than 190 days of work in the year, and in Maine, Vermont, Iowa, North Dakota, South Dakota, Kansas, Delaware, Montana, Wyoming, Arizona, Nevada, Idaho and the District of Columbia there is not nearly enough nursing to be divided between the trained and untrained nurses competing for patients.

Untrained nurses are not on the increase, census figures show, but trained nurses are being turned out to terrific competition by the thousands each year. In Maine, for example, there was in 1900 one trained nurse for every 5,068 persons; in 1910, there was one for every 910; in 1920, one for every 579, and in 1930, one for every 349.

"If nursing is to avoid disaster," says Dr. May Ayres Burgess in presenting these figures in the March number of the *American Journal of Nursing*, "the steady production of more students, who become graduates, must cease. It must cease not only in the small schools, but in most of the large schools as well. Graduate nurses must be employed. If they are unemployable, they must be reëducated. The schools of nursing have produced them. They are members of the profession. Unless their morale is to break down completely, they must either be eliminated or utilized.

"This is a year of national economic distress. Hospitals are short of funds. How, then, can hospitals take care of their patients with reduced numbers of student nurses, with increased numbers of graduate nurses, and without increasing the annual budget? Let us not assume that there is no solution for this problem. Nurses who are intimately familiar with hospital administration may be able to discover new economies, new methods of organization, which will make reductions in the number of student nurses possible. Unless some solution can be found, which it is within the practical means of the hospital to adopt, nursing will continue to grow in numbers and in distress."—American Nurses Association.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Help the Veteran

When the World War Veteran first came home from the wars, the army itself was looking after his affairs. Also the United States Public Health Service, if he was disabled, and the Red Cross.

Before long, however, the army and the health service dropped out of the official picture and a brand new government bureau to be known as the Veterans' Bureau took their place. This bureau was to have charge of hospitalization of veterans still suffering from war disabilities. It was to rate them for purposes of disability compensation, to straighten out war risk insurance tangles and generally to administer, in the interest of the veterans, the growing volume of veterans' law. In the meantime the service men's organizations were growing up, the American Legion, the Disabled Veterans of the World War, the Veterans of Foreign Wars, all of whom established agencies to help the veteran to get his rights under the law. The Red Cross also went right on acting as a friendly intermediary for the ex-soldier.

In 1923, it was brought to the attention of the legislature of the state of Minnesota that in spite of all this organized overlapping system of veterans' aid, the veteran still needed help. Thus the Division of Soldier Welfare was established under the wing of the State Board of Control with a large enough yearly appropriation to set up an office and employ several persons, 80 per cent of whose time has been taken up in the past nine years in helping the veterans to get a fair hearing on compensation claims or to get needed hospitalization from the Veterans' Bureau.

All this in spite of the fact that it was the obvious intention of Congress in setting up the Veterans' Bureau that the bureau should give all necessary aid in securing the rights of ex-soldiers.

It is a foolhardy veteran, now, who submits any sort of claim to the bureau even for simple, routine hospitalization, who does not enlist the liaison officer of his service organization, or the Division of Soldier Welfare, or the Red Cross, or a Congressman, or all four, to help him.

It should not be said, either, that the situation is the fault of the many hard-working, wholly well-intentioned officials of the Veterans' Administration, itself.

But insofar as it affects needed hospitalization and medical care for men who are entitled to such care, it is a situation of real interest to physicians. One important consideration back of the confusion, attendant upon getting a man into a veterans' hospital, is lack of beds. In spite of millions already spent and millions more authorized for the purpose of building more government hospitals, there are not now and probably never will be enough beds in government hospitals.

The solution to the whole situation—and to the elimination of a great deal of wasted money and time—lies in the use of standard civilian hospitals near the home of the veteran for the acute illness and the emergency case. There are plenty of beds in good civilian hospitals where first class medical care is immediately avaialble. In fact these same civilian hospitals are facing a serious administrative and economic problem because of their heavy percentage of empty beds. No waiting and wire pulling ought to be necessary to secure for the acutely sick veteran the use of them.

Ramsey Prepares Its Resolution

Seven sub-committees of the Ramsey County Medical Veterans will undertake a thorough study of the veterans' hospitalization situation upon which a suitable resolution on the subject, for presentation to the American Legion, may be based.

Each committee will investigate one phase of the problem to be dealt with in the proposed resolution. It is obviously necessary to appeal to the veterans themselves, through their service organizations, on any proposal to improve this admittedly difficult situation. The Ramsey county organization is wisely getting its facts before it makes any proposal which is to stand the scrutiny of the officials of its local Legion Posts.

EDITORIAL

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THE STATE MEETING

Final arrangements are now under way for what is undoubtedly to be the most varied and colorful and universally interesting annual meeting of the Minnesota State Medical Association. This meeting is scheduled for May 23, 24, and 25 at the St. Paul Auditorium.

An entirely new program scheme by which no less than three important program sections and sometimes as many as fifteen or twenty sections will be held simultaneously, took shape at the third meeting of the 1932 Committee on Scientific Assembly held at the St. Paul Athletic Club Saturday, March 12.

The unusual interest displayed in advance by the membership of the Association was cited by members of the Committee as necessitating this year's enlarged program. It is to include separate medical and surgical sections; some forty small group table demonstrations; programmed motion pictures on a variety of subjects; and an afternoon of clinics. Program requests coming, more than ever before, from members outside the four large medical centers have chiefly dictated the structure of the program, which will be of especial use and appeal to the general practitioner. As a result, also, many more men than usual from the rural districts will read papers before the various sections of the program.

The total number of men appearing on all of the programs will exceed 120, the committee announced. Among these, besides a representative group of distinguished Minnesota physicians, are several interesting out-of-state speakers. Dr. Walter Sebening of Frankfort-on-the-Main, Germany, who has spent six months in America studying American surgical management of peptic ulcer, will appear on the surgical section of the program. Dr. W. C. Campbell, orthopedic surgeon of Memphis, Tenn., will address one of the noon general sections, as well as Dr. Theodore N. Davis of Greenville, S. C., and Dr. Ralph Major of Kansas City.

The scientific sessions begin with two conferences, one clinico-pathological and the other radiological, on Monday afternoon. They will deal principally with pulmonary tuberculosis and non-tuberculous pulmonary disease.

The medical economics meeting is scheduled to unite the medical association and the Minnesota State Hospital Association, which is also convening at the Auditorium on the same date, in one large general meeting to be held in the Auditorium theater. The subject for discussion at this meeting will be "Medical and Hospital Care of Veterans," and a group of representative physicians, hospital men and laymen will talk on the various phases of the subject. Among the Monday night speakers already scheduled are Father Maurice Griffin of Cleveland, Ohio, Board of Trustees of the American Catholic Hospital Association; Dr. Olin West of Chicago, secretary of the American Medical Association; Mr. Frederic R. Bigelow of St. Paul, and Mr. E. V. Cliff of Ortonville, Executive Committee of the American Legion.

The Tuesday scientific program opens at 8 A. M. with simultaneous medical and surgical sessions, the surgical session occupying itself for a considerable part of the time with surgical aspects of obstetrics, and the medical section chiefly with cardiac disease, cardiac neurosis and a gen-

eral consideration of the rôle played by quackery in the management of neuroses.

At 10 A. M. the entire membership will adjourn to the exhibit hall for the small group table demonstrations which are to occupy an entire hour on both Tuesday and Wednesday mornings. The subjects already definitely determined upon for these demonstrations include eyegrounds; ulcerative colitis; the physiological action of animal venom; the use of the artificial larynx; peripheral vascular disease; the photoelectrometer as applied to hemoglobin demonstration; the Friedman hormone test; Congo red test for amyloids; syphilis, practical points and therapy; trichomonas vaginalis; the tuberculin test; tularemia; varicose leg ulcers; typing for pneumococci; horseshoe kidney; lung abscess and lipiodol; foreign bodies and medical conditions in the esophagus; blood transfusion; undulant fever; primary tuberculosis in childhood (X-ray films); fresh pathology; cauterization of the cervix; audiometer; Schick test; blood; cholecystographic technic; surgical treatment by maggots.

A joint session of all sections will follow at 11 A. M on Monday, addressed by Dr. Campbell, on the subject of Fractures in and about the Neck of the Femur. Another joint session following lunch will be on the general subject of malignancy, with Dr. W. J. Mayo presiding. The medical section for the afternoon opening at 2:30 will include, among other varied subjects, a symposium on diseases of childhood. The surgical section for the afternoon will devote itself to different surgical problems involved in thyroid disease; intussusception in infants; tuberculosis of the kidney; cancer of the rectum.

The big social event of Tuesday night will be the annual banquet of the association to be held at the Lowry Hotel. Speakers for the affair will be Dean R. E. Scammon of the College of Medicine of the University of Minnesota, who will talk on "The Relation of the Medical School to the Man in Practice"; Rev. W. C. Sainsbury of Fargo, North Dakota, whose subject will be "The Family Doctor"; and Dr. M. S. Henderson of Rochester, president of the State Association.

Wednesday's scientific sessions will follow the Tuesday schedule with separate medical and surgical sections meeting until 10 A. M., followed by the table demonstration hour and the joint session terminating at 12.

A joint session of an hour will open the final Wednesday afternoon session followed by two and one-half hours of clinics, to be held also at the Auditorium meeting place.

The paper on peptic ulcer by Dr. Sebening to be read in the course of the morning surgical session will be a high light of the day, with two other headliners figuring at the joint sessions of the morning and afternoon programs. The latter will be the explanation by Dr. Davis of South Carolina of his method of prostate resection and also the discussion of hypertension by Dr. Ralph Major of Kansas City in the afternoon.

A special clinic in first aid has been arranged for Minnesota Highway Patrolmen for Wednesday afternoon, preceding the afternoon clinics, which are to include dermatology, neurology, cardiac, fracture, pediatric, and surgical clinics.

The separate medical section will devote itself to a variety of subjects, including recent developments in endocrinology; treatment of chronic arthritis with intravenous vaccines; and evaluation of the periodic medical examination.

A special program feature is to be made of the moving picture theater to be set up in the exhibit hall. A series of eleven films, some of them talking films, have already been secured. These will be shown at definite programmed times, the committee announces, and the program will be continuous. Among the films already booked are "Cancer of the Skin"; "Bone Tumors"; "Puerperal Infection," produced for Dr. D. H. Bessesen; "Preliminary Hemostasis in Goiter Surgery," produced for Dr. Martin Nordland; "The Tucking Operation for Strabismus," produced for Dr. Frank E. Burch; "Delivery of Twins," produced for Dr. J. J. Swendson; "The Gillette State Hospital for Crippled Children"; "Features in Hospital Administration"; "Repair of Urethrocele, Cystocele, and Lacerations of the Cervix"; "Repair of Second and Third Degree Lacerations of the Perineum and Rectocele." The committee announces that there will be time for a few more films besides these and invites association members to submit any others they may have for this showing.

An unusually large number of scientific and technical exhibitors have already taken space in the large ground floor exhibit hall in the fourth street ball room. Among them are the yearly increasing number of individual exhibitors competing for the gold medal annually offered for the best exhibit by an individual Minnesota physician by the Southern Minnesota Medical Association.

The tentative schedule for the business meetings provides for dinner meetings of the Council and the Reference Committees Sunday night, May 22, preceding the official opening of sessions. At 9 A. M. Monday the first meeting of the House of Delegates is scheduled, to be followed by a 12 o'clock luncheon meeting for this body on Tuesday, May 24. The Council is to meet again Monday noon, May 23, and at 2:30 P. M. Tuesday afternoon. Presentation of new officers will take place Wednesday morning, May 25.

Minnesota Alumni luncheon and fraternity luncheons are scheduled for Monday, Tuesday, and Wednesday noons. Arrangements for other social events, including the annual golf tournament, are pending.

The program of the Women's Auxiliary, which is holding its annual meeting, as usual, at the

same time as the medical association, will concentrate this year on a series of round table discussions. These discussions, all relating to problems of public relations, will be led by Dr. O. E. Locken of Crookston, Dr. C. B. Wright of Minneapolis, and others. The annual Board meeting of the organization will be held Tuesday morning. Dr. Walter Alvarez of Rochester will be guest speaker at the annual Auxiliary luncheon, Wednesday, May 25. Dr. Alvarez' subject will be "Foods."

TRANSURETHRAL RESECTION

Of the various infirmities which beset the aging man, none is more distressing than that of prostatic obstruction. It has been said that one man in three will be afflicted with enlargement of the prostate gland. Fortunately, however, such enlargement will actually obstruct the urinary bladder in only a relatively small number of cases. Obstruction is dependent not so much on the size of the gland as the position the hypertrophied gland assumes in relation to the neck of the bladder. Thus only a relatively small portion of the gland may protrude into the outlet of the bladder or impinge on it so as to cause difficulty of urination. Secondary inflammation of the tissues surrounding the internal sphincter and prostatic portion of the urethra, followed by contraction at the neck of the bladder, is also a frequent factor in causing obstruction.

To give surgical relief for prostatic obstruction has always been a formidable procedure. A generation ago it was accompanied by a frightful rate of mortality, so that many of the victims preferred to suffer palliative catheterization or suprapubic drainage rather than take the risk of prostatectomy and its complications. With improvement in surgical methods, and particularly in preoperative and postoperative care, the rate of mortality has in recent years been greatly reduced. In spite of every precaution, however, prostatectomy is occasionally followed by complications such as persistent infection of the urinary tract, stricture of the prostatic portion of the urethra, incontinence, persistent suprapubic or perineal fistula, and rarely by re-formation of prostatic tissue. The economic factor is also a formidable feature of prostatectomy, since it requires hospitalization with both medical and nursing care over a period averaging eight or ten weeks. It is obvious, therefore, that any method which gave the slightest opportunity to circumvent so formidable a procedure would be seized by the physician and layman alike. It is only natural, then, that in recent months a procedure termed transurethral prostatic resection should have aroused widespread interest.

It has been the history of many therapeutic procedures that one step leads to another until a method is evolved which is widely applicable. Removal of obstructing portions of the prostate gland through the urethra has had such a career. Such removal began with the early, unsatisfactory attempts of Mercier and Bottinio. Later, this procedure was revived with the employment of the endoscopic approach by Goldschmidt, Young and Luys; then it was further developed, and its field was amplified by Caulk, and recently it was refined and broadcast through application of visualization by Stern, Davis, McCarthy and Bumpus. The method formerly called "the prostatic punch operation" has been more recently dignified by the urologist, so that it now bears the somewhat imposing term of "transurethral resection." In the hands of an experienced and skillful urologist, transurethral endoscopic resection undoubtedly will prove to be an invaluable addition to methods of treating prostatic obstruction. Its many advantages, such as lowered mortality, comparative freedom from permanent complications, reduction in duration of hospitalization, and reduction in time of postoperative care and convalescence, are obvious. Its superiority in removing commissural obstruction resulting from contracture of the vesical neck, or that caused by enlargement of the median lobe of the prostate gland, is undoubted. Minor degrees of enlargement of the lateral lobes also should be regarded as amenable to such resection. There is much evidence, however, which tends to support the conservative surgeon in his contention that, with marked enlargement of the lateral and median lobes, the best permanent results can be obtained by prostatectomy. On the other hand, even in this group of cases, excellent results have been claimed by the enthusiastic endoscopist, so that time alone will have to decide. The chief argument against transurethral resection, with obstruction of lateral lobes, is the probability of recurring obstruction because of incomplete removal. The average interval of time before obstruction recurs has not as yet been determined in a large series of cases. Even so, repetition of transurethral resection is not a formidable procedure, and if the patient is free from urinary symptoms during an interval of several years, he would probably be willing to take the chance.

It is of considerable interest that the old-fashioned case, in which there is a huge, hypertrophied prostate gland, with distended bladder, is now seldom observed. Instead, the patient of today who seeks medical advice soon after onset of symptoms, usually has only 30 to 60 c.c. of residual urine, and on rectal examination the prostate gland is found to be only moderately enlarged. This earlier consultation is undoubtedly the direct result of numerous communications, written by members of the medical profession, which have appeared in both medical and lay journals in the last decade. In the majority of

these cases, the condition is amenable to transurethral resection.

Transurethral resection has come to stay. Whether its field will be expanded to include every case of benign prostatic obstruction remains to be seen. It is obvious that the best results from endoscopic resection will be obtained only with skill and wide experience.

W. F. Braasch, M.D.

OCCUPATIONAL THERAPY IN MINNESOTA

A realization of the value of occupational therapy for those temporarily or permanently disabled by accident or disease was one of the few tangible good results of the World War. Interest in this form of reconstructive work has persisted to some extent during the post-war period in its application to every-day casualties, but the medical profession is not acquainted with the nature or extent of this activity in our own state.

Occupational therapy consists of work specially selected for the patient partially or totally incapacitated by accident or disease, to accelerate the individual's return to his vocation or when necessary the teaching of new trades. The various centers are not self-supporting, as the money realized on the sale of articles less the cost of materials is turned over to the worker. Thus the various therapeutic centers require some financial backing.

The economic value of this type of work is considerable. It hastens the return to economic independence and thus relieves the always heavy burden on charitable undertakings. The psychic effect on the patient is fully as important. These individuals are given work, which is an essential to happiness, and are able to be at least partially self-supporting. Their morale as well as that of the institution is thus enhanced. Patients as a rule are enrolled only on recommendation of the attending physician and the type of work is selected in coöperation with a trained supervisor. Physiotherapy is a valuable adjunct in many instances and should be available at each center.

The training is carried out, in the larger centers of population, at headquarters known as curative work shops, in the hospitals, and in the home. Games and entertainment in the form of reading are adjuncts in the hospitals particularly.

The type of cases enrolled includes those suffering from fractures, encephalitis, spastic paralysis, poliomyelitis, nerve injuries, congenital deformities, arthritis, heart disease, tuberculosis and mental trouble.

In the larger centers of population—Minneapolis, St. Paul, Duluth, St. Cloud, and Rochester, for instance—vocational centers have been in operation for a varying number of years. These are supported by different agencies.

In Minneapolis the Curative Work Shop is being supported by the Citizens Aid Society and the Minneapolis Foundation as a demonstration of the need for such a service. The shop is under the direction of the Visiting Nurse Association but is a project of the Junior Board of the Visiting Nurses Association and the Junior League of Minneapolis.

In St. Paul, a Curative Work Shop was established in 1928 as a private enterprise by its director, Miss Martha R. Eming, as a demonstration of its need. Over a hundred cripples have been enrolled. Efforts so far to interest charity organizations or those philanthropically inclined have been unavailing and financial assistance will be necessary if the work is to continue.

In Duluth an organization known as the Duluth Association for Physically Handicapped sponsors the work, which is carried on in St. Mary's and St. Luke's hospitals and among the home-bound.

Many of the state institutions for the insane and the county tuberculosis sanitaria have their units.

Occupational therapy is taught at schools, sanctioned by the American Medical Association, at Boston, Philadelphia, St. Louis, Northwestern University, and Milwaukee Downer College. Graduates are registered in the American Occupational Therapy Association, of which the Minnesota Association of Occupational Therapy is a component organization. The state branch holds quarterly meetings in different parts of the state for the purpose of promoting the work and keeping up professional standards.

We know of no more worthy constructive undertaking than this. The insurance companies might well become interested from the money standpoint. Each community should possess a center and furnish the necessary financial support. The physician is in a position to lend his coöperation.

VEGE-SEA AND ORO BRAND KELP SALT NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that "Vege-Sea" is stated by the Oakland Food Products Co., Oakland, Calif., to be dried and powdered kelp, while "Oro Brand Kelp Salt" is stated to be a flavored mixture of this kelp with ordinary salt. The marketing of dried kelp or of a mixture of kelp and salt does not present any originality, and hence there is no warrant for the sale of these preparations under coined names. The Council found "Vege-Sea" and "Oro Brand Kelp Salt" unacceptable for New and Non-official Remedies because they are marketed with claims that are unwarranted and misleading and because the recognition of proprietary names for these unoriginal preparations is not in the interest of rational therapy. (Jour. A. M. A., February 20, 1932, p. 640.)

MISCELLANEOUS

MOST GOVERNMENTS ARE INEFFICIENT OR CORRUPT—SOME ARE BOTH (Continued)*

EDWARD H. OCHSNER, M.D.
Chicago, Illinois

The founders of our government subdivided it into three branches: the administrative, the legislative, and the judiciary. This was done on the theory that each had a distinct function to perform and that they would all act somewhat as checks and balances upon each other. This seemed logical at the time and undoubtedly has many advantages, but our founders did not and could not foresee one of its dangers and one of the abuses to which this division was to be put, namely, the practice of sidestepping duty and responsibility. One of the chief governmental in-and-outdoor sports today is "passing the buck," with an "open season" the year round.

In a project involving as many problems as Social Insurance does, all the branches of the government would be involved in its execution—the administrative in administering it, the legislative in enacting the necessary laws, and the judiciary in adjudicating them. Let us then examine briefly how the different branches have deported themselves in the more recent past. Let us start by examining just one typical administrative activity of both the federal and the state governments.

Individual members of the medical profession have repeatedly called attention to the great need of a careful study of all delinquents and criminals in our state and federal institutions in order to determine the mental and physical condition of each member of these two classes with a view to their rehabilitation and possible reclamation, and yet almost nothing has been accomplished along these lines by governmental agencies. Dr. Frank L. Rector who recently completed a survey under the auspices of the National Society for Penal Information on health and medical work in all state and federal prisons and adult reformatories, states unequivocally that in not one of these institutions is there a well-rounded balanced medical and health program. While some of them provide acceptable accommodation for the care of the acutely sick or injured, there is little or no provision for the rehabilitation of the physically handicapped so that they will be better equipped for earning an honest living after their discharge to civilian life.

Just one typical example. On the day Dr. Rector visited the Ohio State Penitentiary, there were four thousand four hundred seventy-five prisoners within its walls, of which one hundred fifty-six were hospitalized. There was but one physician on the staff, all other attendants at the hospital being prisoners. While the physician was nominally on a full time basis he was carrying on an outside private practice as his salary from the state was insufficient to meet his living expenses. What can one part-time physicians accomplish with that many patients, a large percentage of whom are physically handicapped, mentally abnormal and emotionally maladjusted? Ohio is a fair example. In most of the other penitentiaries and in the federal prisons, conditions are no better and in some even worse.

Now let us investigate some of the legislative problems. While nearly every legislative body contains some men of outstanding ability, the great majority of legislators have not the slightest conception of what is required of their position and blindly follow their party bosses, who are not generally known for their altruism, their patriotism, or a burning desire to promote the public welfare. One of the worst features of our legislative activities is the fact that a small, well-organized and insistent minority can usually get its measures enacted into law unless some other group is adversely affected by the proposed legislation and makes a counter-attack.

Another bad method of securing legislation is the system of trading. An interesting occurrence of this sort happened in the state of Illinois in 1923. About that time a Chicago mayor was disgracing not only his city and state but the nation by the slogan, "Hit King George on the Snoot." A free citizen from the corn lands of the state decided that he would like to be sent to the state legislature, took up the battle cry, had just one plank in his platform, namely to make the American language the official language of the state. He was elected. By use of extensive vote trading he secured the passage of the following:

OFFICIAL STATE LANGUAGE

An act establishing the American language as the official language of the State of Illinois (Approved June 19, 1923. L. 1923, p. 7). Preamble.

177 (American language). 1. Be it enacted by the people of the State of Illinois, represented in the General Assembly:

The official language of the State of Illinois shall be known hereafter as the "American" language.

So much for administrative and legislative inefficiency. The next article will take up the judiciary.

*One of a series of articles appearing in state medical journals on various phases of socialized medicine.

AN UNUSUAL URINARY PARASITE OR CONTAMINATION

JOHN M. CULLIGAN, M.D., M.S., F.A.C.S., and
BERNICE MEDLEY
Saint Paul

During a routine urinalysis of a patient, organisms were seen which we had never observed before. The patient was a male, single, seventeen years of age, who consulted us for a condition which was related in no way to the urinary system, and he had no complaints referable to the genito-urinary tract.

The organisms were living. Their bodies were roughly the shape of an electric flat-iron with two

spear-like flagellæ protruding from the pointed end of the bodies. Their size was very uniform, the bodies measuring roughly 100 microns in diameter, and the flagellæ about 75 microns in length. The flagellæ moved rhythmically, sometimes separately and again in unison. Occasionally the flagellæ would flex themselves until they lay against the body of the parasite. Twice the organism was seen to turn over completely.

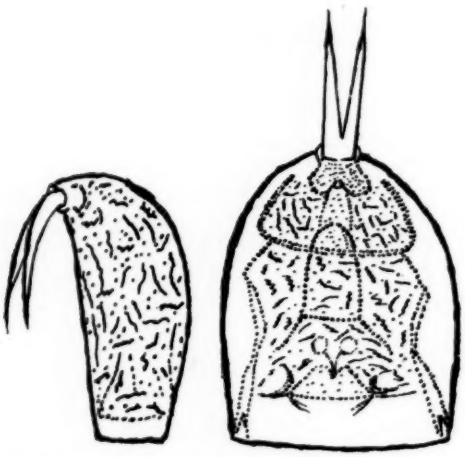

Fig. 1 *(left)*. Antero-posterior view of the parasite.
Fig. 2 *(right)*. Lateral view of the parasite showing the flagellæ flexed onto the body of the organism.

Their activity was marked at first but this gradually diminished, and after about ten minutes ceased entirely.

The parasites were finally identified as a rotifer of the Lecane type. They are notorious as contaminators and are found in stagnant water. Because of the possibility of contamination as a source, great care was taken in the collection of the specimen, using only new sterilized containers and laboratory equipment. In spite of this the organisms still persisted.

We are reporting these findings, realizing that they may still be a contamination, in spite of our efforts in avoiding it, and because we wish to know if any of our colleagues has observed the same phenomenon.

THE PREVENTION AND CONTROL OF VENEREAL DISEASES

A report of considerable interest recently submitted to Congress by Surgeon General H. S. Cumming deals with the prevention and control of the venereal diseases. During the fiscal year recently ended, the state health officers of 43 states reported to the Public Health Service slightly more than a quarter of a million cases of syphilis and more than 150,000 cases of gonorrhea. These diseases as a class continued to exceed the number of cases reported during the year of any other single communicable disease with the exception of measles.—U. S. P. H. S., March 11, 1932.

OF GENERAL INTEREST

Dr. A. B. Stuart, of Cloquet, Minnesota, addressed the Young Men's Forum of Cloquet Wednesday evening, March 9, on "The Menace of Medical Socialism."

Dr. Myron O. Henry, Minneapolis, talked before the Douglas County Medical Society at Superior, Wisconsin, March 2, 1932, on "Fractures of the Hip."

Dr. W. W. Duke of Kansas City, Missouri, addressed the Hennepin County Medical Society on "The Dawn of a New Specialty in Medicine—Allergy," Wednesday, March 2.

Dr. H. G. Irvine of Minneapolis was elected grand primarius of Alpha Kappa Kappa, national medical fraternity, at the concluding session of their three-day convention in New Orleans recently.

Dr. Ehrling L. Bergquist, son of Mr. and Mrs. E. L. Bergquist, Minneapolis, a graduate of the medical school of the University of Minnesota, class of 1929, and Miss Gertrude Babcock, daughter of Mr. and Mrs. M. Babcock, of Fairfield, Connecticut, were married at the home of the bride Saturday, March 5.

The 1932 Committee on Public Health Nursing for the State Association is to be headed by Dr. Harry Oerting, St. Paul. Other members are Dr. George Earl, St. Paul; Dr. C. B. Wright Minneapolis; Dr. H. I. Tregilgas, South St. Paul; Dr. W. H. Eude, Minneapolis; Dr. T. C. Flynn, Redwood Falls; and Dr. C. E. Caine, Morris.

Dr. Kenneth Bulkley is the new president of the Minneapolis Surgical Society elected at the Hennepin County Medical Society headquarters March 3. Other officers chosen are Dr. Martin Nordland, vice president; Dr. F. A. Olson, secretary-treasurer; Dr. R. C. Webb, council member for a five-year term, and Dr. E. A. Regnier, council member for a four-year term.

Hutchinson Community Hospital has been bequeathed $10,000 by L. A. Ritter as a trust fund, the net income from which is to be used for medical, surgical and nursing care for deserving persons who may from time to time be patients therein. Trustees of the funds are the Farmers and Merchants State Bank and the president of the hospital association.

Dr. and Mrs. J. F. McClendon and their sons, Stewart and John, Minneapolis, sailed March 24 on board the Asama Maru for the orient. Dr. and Mrs. McClendon and sons will make their home in Sendai, Japan, where Dr. McClendon will be associated with the Tohoku Imperial University as a visiting professor. Dr.

McClendon is a professor of physiology at the university.

April is the month chosen each year by the National Tuberculosis Association for its intensive campaign in the tuberculosis fight. This year its slogan is "Find the Other Case." A special pamphlet, "Where is the Other Case " has been prepared by the Association for physicians and is available upon request (without charge) at the Minnesota Public Health Association, 11 West Summit Ave., St. Paul.

Dr. Mario McC. Fischer, secretary of the St. Louis County Medical Society, is Duluth's new public health director, having been appointed, effective March 15, by the safety commissioner, Warren S. Moore. He succeeds Dr. L. A. Sukeforth, who resigned in December after eight years of service. Dr. Fischer will be employed full time. He is a graduate of the University of Minnesota medical school.

Contagious disease cases in the city of Duluth in the future will be cared for at St. Mary's and St. Luke's hospitals, and the municipal contagious hospital at Thirteenth Avenue west will be closed, under approval given by the city council at a weekly meeting held March 7. The council accepted the bids of the two hospitals to care for patients. The plan was recommended in a survey made by a government health director of that district.

"Pioneer Medicine in the Western Reserve," a book written and illustrated by Cleveland physicians, was published early in March by the Cleveland Academy of Science. The book relates in colorful detail the early medical history of Ohio. Among those who collaborated in the preparation of the book are Howard Dittrick, Frederick C. Wait, R. C. Rosenberger, J. Richey Horner, Edward Spease, Thomas J. Hill, Marion Noville Gibbons, J. P. Sawyers and Joseph T. Smith, Jr.

Sanction of the Council of the Minnesota State Medical Association was given at its last meeting for a survey of cancer statistics of Minnesota to be undertaken under the auspices of the American Society for the Control of Cancer. The committee of the state association appointed by Dr. M. S. Henderson to cooperate with the representatives of the cancer society includes Dr. H. E. Robertson, Rochester, chairman; Dr. Arthur Collins, Duluth; Dr. J. C. Litzenberg, Minneapolis; and Dr. John Rothrock, St. Paul.

The completed roster of members and officers of all the component societies of the Minnesota State Medical Association will appear in the May issue of Minnesota Medicine, after which time reprints will be available. This roster goes to every county attorney, every probate judge and most of the Insurance Companies in Minnesota for their use, identification and selection of medical service. Only those members whose dues have been paid and whose names have thus been forwarded to the state office before April 12, the publication date of the roster, will appear in this official list for 1932.

Dr. Leonard G. Rowntree, now director of clinical investigation of the Mayo Clinic, Rochester, Minnesota, and professor of medicine in the University of Minnesota, will head the new Philadelphia Institute of Medical Research, it has been announced.

The institute will center its activities in the Philadelphia General Hospital and will work with the various medical schools already established in the city. The new organization will be developed along the lines of the famous Pasteur Institute in Paris and the Rockefeller Institute for Medical Research in New York.

One hundred and twenty-five medical men, including staff members of the Charles T. Miller Hospital, were guests at a dinner given by the hospital in honor of Dr. John L. Rothrock Tuesday night, March 1, 1932.

Dr. Rothrock addressed the group on "Medical Progress in the Last Forty Years." Dr. Rothrock, famed as an obstetrician, has practiced in St. Paul for more than forty years. In December, 1931, he announced his intention of retiring, but he has been called on to continue his services and now expects to give up his practice gradually.

Dr. H. Kyuno, director of the Municipal Tuberculosis Sanatorium at Yokohama and a distinguished Japanese expert on tuberculosis, visited sanatoriums for treatment of the disease in and near the Twin Cities March 4, as part of a world tour on which he is studying such institutions.

As the guest of the Ramsey County Public Health Association, he visited Ancker Hospital and the Ramsey County Children's Preventorium in St. Paul.

He also inspected the Lymanhurst School for Tubercular Children in Minneapolis and Glen Lake Sanatorium at Oak Terrace before leaving for Chicago Friday night. He will sail from New York soon and expects to return to Yokohama in August.

The University of Minnesota, Carleton College and St. Olaf College share the wave length of 1,250 kilocycles with the commercial station WRHM. The three educational studios together use twenty hours a week and WRHM 104 hours. WRHM has petitioned the Federal Radio Commission at Washington to give them the entire time on this wave length. As a countermove the three educational institutions, claiming that the two commercial stations, WCCO and KSTP, furnish all the commercial broadcasting necessary in this area, have now petitioned the Federal Radio Commission to give the three colleges the entire time on this wave length. As radio listeners know, WRHM carries obnoxious advertising such as invitations for free medical examinations, and the medical profession of Minnesota is requested to write the Federal Radio Commission, Washington, D. C., protesting any curtailment of the use of 1,250 kilocycles by the educational institutions mentioned.

Dr. L. R. Critchfield, 1932 chairman of the Public Health Education Committee, reported on the scope of the work of his committee and on its program for the year at the regular February meeting of the Committee Chairmen of the State Association held Monday, February 29, at the Minnesota Union, University of Minnesota.

In the absence of Dr. M. S. Henderson, Rochester, president of the Association, Dr. E. A. Meyerding, St. Paul, Secretary, presided. Dr. C. B. Wright, Minneapolis, reported on the sessions devoted to the discussion of hospitalization and medical care of veterans held in connection with the Congress on Medical Education and Licensure in Chicago. The following chairmen and officers were present: Dr. Critchfield, Dr. W. H. Hengstler, Dr. John H. Armstrong, Dr. Leo Rigler, Dr. J. A. Watson, Dr. Gilbert J. Thomas, Dr. T. H. Sweetser, Dr. N. O. Pearce, Dr. S. R. Maxeiner, Dr. Wright and Dr. Meyerding.

Dr. and Mrs. J. A. Watson, Minneapolis, and their son, James Watson, Jr., will sail April 5 for a trip abroad. They will land at Naples, Italy, where their daughter, Miss Elinor Watson, who is studying music at the University of Munich, will meet them. Dr. and Mrs. Cecil J. Watson, son and daughter-in-law of Dr. and Mrs. Watson, may also meet the travelers in Naples. Dr. Cecil Watson is doing research work at Munich as a fellow from the national research council of Washington.

Munich will be the headquarters of the party and they will take short side trips to Vienna, Budapest and other cities following their drive northward from Naples to Munich. Dr. and Mrs. Watson and James, Jr., will visit in France and Switzerland before going to England, where they will visit another son, Mr. Leland Watson, a Rhodes scholar at Oxford university. They will visit in Ireland before returning to the United States about the middle of June.

COÖPERATIVE CLINIC TOURS

Arrangements have been made by the various State Medical Journals with the Amerop Travel Service for members to obtain at a very reasonable figure Clinic Tours to Europe this summer. The Centennial Anniversary meeting of the British Medical Association affords a special attraction this year. Clinics by outstanding members of the profession in Europe are being arranged in many of the principal cities of Europe, which include London, Paris, Vienna, and Berlin.

The steamers chosen are the palatial Bremen and Europa of the North German Lloyd Line and the best hotels will be used for those travelling first class.

Tour 1.—Leaves New York on the Bremen June 7, arriving at Cherbourg June 12. Thence to Paris, Berne, Lucerne, Zurich, Munich, Vienna, Prague, Dresden, Leipzig, Berlin, Amsterdam, The Hague, London, leaving Southampton July 29 on the Europa and arriving in New York August 3. Price first class $1,215; tourist $894.

Tour 2.—Leaves New York on the Europa July 19, arriving at Southampton July 24, thence to London, The Hague, etc., reversing the route of Tour 1, sailing from Cherbourg September 2 and arriving at New York September 7. Price: first class $1,095; tourist $774.

Tour 3.—Leaves New York on the Europa July 19. Only London and Paris clinics arranged for, with return to New York August 12 on the Bremen. Price: first class $760; tourist $365.

A deposit of $50 is required for reservation with return in full upon notification at least four weeks prior to sailing. Checks may be sent to the office of MINNESOTA MEDICINE or direct to Amerop Travel Service, 132 North LaSalle St., Chicago.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

FORMER NATUROPATH PLEADS GUILTY TO PRACTICING HEALING

State of Minnesota *vs.* Mitchell Jurdy

"Dr." Mitchell Jurdy, listed in the 1931 Minneapolis City Directory as a Naturopathic Physician, entered a plea of guilty to practicing healing without a Basic Science Certificate, on February 19, 1932, before the Hon. Frank E. Reed, Judge of the District Court at Minneapolis. Judge Reed sentenced Jurdy to a term of one year in the Minneapolis City Workhouse and stayed the sentence for one year pending the good behavior of the defendant and his compliance with the Medical Laws of this State.

Jurdy formerly maintained an office at Seventh and Hennepin in the City of Minneapolis and later practiced in his home at 3104 Portland Avenue. The present charge against Jurdy is based upon the alleged treatment of one Ruth Kleopfert, who, it was claimed, had been suffering for some time from epilepsy. Mr. Kleopfert, father of the patient, testified that they met the defendant at the Riley Long Life Health Club where Jurdy lectured. On the date of his sentence Jurdy told the representative of the Minnesota State Board of Medical Examiners that he has severed all connections with the Naturopathic Organization. The defendant is a young man about 28 years of age, married and the father of one child, his home formerly being in the State of Idaho.

DULUTH HEART "SPECIALIST" PAYS ONE HUNDRED AND FIFTY DOLLARS FINE

State of Minnesota *vs.* Hansen.

Harry A. Hansen entered a plea of guilty to practicing healing without a Basic Science Certificate on March 9, 1932, before Judge Edwin J. Kenny of the District Court in Duluth. After admonishing the defendant to comply with the Medical Laws of this State and informing him that a second violation of these laws would result in a straight Work-farm sentence without the opportunity to pay a fine, Judge Kenny imposed a fine of $150, which the defendant paid.

Hansen is 58 years of age and for the past four years has been doing business at 1906 West Superior St., Duluth, as the maker of "Master Medicines." He has been specializing in the treatment of heart ailments,

tuberculosis, ulcers of the stomach and rheumatism. Prior to that time he was located at Ashland, Wisconsin, where he did similar work. The investigation also discloses that at one time he was an extra man on the Ashland Police Department. Hansen informed a representative of the State Board of Medical Examiners that he had the only cure in the world for tuberculosis which he was selling for $3.00 per two ounce bottle. People would go to Hansen's office where he would discuss with them their symptoms and he would then recommend his preparations. He charged $5.00 per two ounce bottle for his heart medicine. Hansen claims to have no medical education nor has he studied pharmacology except that obtained from reading books in his office. He claims to have his knowledge bestowed upon him in answer to a prayer.

DULUTH QUACK SENTENCED TO WORK-FARM

On March 4, 1932, John F. Kroeten, 48 years of age, entered a plea of guilty to practicing healing without a Basic Science Certificate before the Honorable Edwin J. Kenny, Judge of the District Court at Duluth. Judge Kenny sentenced the defendant to serve three months on the St. Louis County Work-farm. The Court refused to suspend the sentence and as a result thereof Kroeten must spend the next three months on the St. Louis County Work-farm.

Kroeten is an itinerant quack who has attempted to practice healing in St. Paul, Minneapolis and Eau Claire, Wisconsin, without the "formality" of obtaining a license. He is a carpenter and painter by occupation. He claims to have obtained his knowledge in the healing arts from other members of his family. Kroeten was arrested February 24, on complaint of the State Board of Medical Examiners, and was confined to the County Jail until March 4, because of his inability to furnish $500 bail. Some of the ailments Kroeten claimed to be able to cure were varicose veins, running sores, blood poison, rheumatism and "cancer on the outside."

This is the first prosecution for violation of the Medical Laws in St. Louis County in the past year and the Court by imposing a straight Work-farm sentence has made it very plain that quackery will not be tolerated in that County. Splendid coöperation was also received in this case from Harry E. Boyle, County Attorney, T. J. Naylor, his assistant, and the Police Department of the City of Duluth.

THE ADMINISTRATION OF SUPRARENAL CORTICAL EXTRACTS

The efficacy of replacement therapy in cases of Addison's disease by the injection of suitably prepared extracts of the suprarenal cortex, freed as far as possible from the epinephrine liberated by the medulla of the gland, has apparently been established. For patients that tolerate intramuscular injection well, this is, perhaps, the preferable method of administration. The intravenous method is indicated when the patient is in crisis and an immediate response is necessary. The possibility of effective oral administration has recently been reported on. In cases in which prolonged treatment is demanded, the oral route may be of preferential utility. (Jour. A. M. A., January 2, 1932, p. 52.)

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of April will be as follows:

April 6—Personal Hygiene—Rest and Sleep.
April 13—Leg Cramps.
April 20—When Pneumonia Begins.
April 27—Spinal Cord Tumors.

AMERICAN PROCTOLOGIC SOCIETY

The thirty-third annual meeting of the American Proctologic Society will be held in Memphis, Tennessee, on Friday and Saturday, May 6 and 7, 1932. Headquarters will be at the Hotel Peabody. The program includes clinics, and scientific papers. All interested members of state medical associations upon the payment of the usual fee of $5.00 are eligible to attend the session which has been arranged to convene immediately preceding the A. M. A. meeting at New Orleans, May 11.

WOMEN'S AUXILIARY
Minnesota State Medical Association

President—Mrs. James Blake, Hopkins
Chairman Press and Publicity—Mrs. Glen R. Matchan, Minneapolis
Editor—Mrs. Horatio B. Sweetser, Jr., Minneapolis

CAMP RELEASE MEDICAL AUXILIARY

Mrs. R. C. Adams, Bird Island, president of Camp Release Medical Auxiliary, announces the following appointments of Public Health Chairmen for the Camp Release district: Renville County, Mrs. A. A. Passer, Olivia; Yellow Medicine County, Mrs. J. Kilbride, Canby; Chippewa County, Mrs. L. G. Smith, Montevideo; Lac Qui Parle County, Mrs. Nels Westby, Madison.

RAMSEY COUNTY

At the regular meeting of the Ramsey County Auxiliary at the home of Mrs. K. C. Wold, January 25, a silver cup was awarded to Robert Laurason of Harding High School for the best paper on "Cause and Prevention of Tuberculosis." Mr. Paul Fesler gave an interesting talk on the "Hospitalization of Veterans of the World War."

On February 12 a party was given at the Ramsey County House for the inmates. From the progressive

card party also held during February, a substantial sum was realized to be used toward the Student Loan Fund.

HENNEPIN COUNTY

The February meeting of the Hennepin County Auxiliary was held Wednesday, February 24, in the Society rooms, where a program inspired by the Washington centennial was greatly enjoyed.

At the annual meeting and election of officers of the auxiliary held March 23, at 10:00 A. M., in the Nicollet Hotel, Minneapolis, the following officers were elected:

President, Mrs. Hugh Tunstead; president-elect, Mrs. F. A. Erb; first vice president, Mrs. Emil Geist; second vice president, Mrs. Moses Barron; recording secretary, Mrs. G. T. Nordin; corresponding secretary, Mrs. H. B. Sweetser, Jr.; treasurer, Mrs. George G. Eitel; auditor, Mrs. Glenn Matchan; custodian, Mrs. H. W. Quist.

A class for the study of international relations has been organized under the very able leadership of Mrs. Walter Marcley. This class is open, without charge, to any members who care to attend the meetings.

PROCEEDINGS OF THE MINNEAPOLIS SURGICAL SOCIETY

SYMPOSIUM ON FRACTURES

Conducted Jointly with the Minneapolis Regional Sub-Committee of the General Fracture Committee of the American College of Surgeons
Meeting of Wednesday, February 3, 1932
Auditorium of the Medical Arts Building, Minneapolis
Dr. J. Frank Corbett, Presiding

Dr. J. Frank Corbett: As President of the Minneapolis Surgical Society, I have been requested to call this meeting to order. After a few general statements have been made the conduct of the meeting will be turned over to Dr. Kenneth Bulkley, Chairman of the Minneapolis Regional Sub-Committee of the General Fracture Committee of the American College of Surgeons.

There has been a tendency in this locality for general surgeons to neglect fracture treatment, possibly because of the lure of abdominal surgery. This is not true to so great an extent in other places, as the work of Scudder, Speed, Stimson, Blake, Ashurst, Bohler and other general surgeons in recent times demonstrate. The early fundamental principles of bone repair and of fracture treatment were largely in the hand of general surgeons; notably with Murphy, Senn, Parks, MacEwen, Ashurst, Cheyne, and Burghard, Lister, Brandenheuer, Trendelenberg, Bunger, Dawbam, Handley, Freeman, Konig, Lane, Langenbeck, McBurney, and Cotton. More recently the diligence in publishing and the scientific efforts of Robert Jones, Albee, Whitman, Hibbs have made the impression that fractures were an orthopedic problem.

It is manifestly impossible that all fractures could be treated by the relatively few orthopedic men available. This problem is still a duty of the general surgeon. The purpose of this meeting is to make general surgeons fracture minded. It is hoped that the general surgeon will see that he ought not to neglect this field. This entails interest in the subject, careful study, and the solution of problems that are still unsolved. The field is enormous and can not be discussed in a few minutes except in a general way. This will be gone into in more detail by those who follow me. Unless treatment is manifest and some fruits of this interest are developed, the treatment of fractures will pass from the realm of the general surgeon.

Dr. Kenneth Bulkley.—In 1912 the American College of Surgeons was incorporated; in 1913 it emerged from its swaddling clothes and since then has rapidly progressed to young manhood. Among its major achievements the most prominent unquestionably has been its work in the betterment of hospitals through its Hospital Standardization Committee. More recently it has turned its attention to another fertile field—namely the betterment of the care of fractures. In order to carry on this work it appointed what is known as the General Fracture Committee of the American College of Surgeons. This Committee, realizing that it could not carry out its program of improvement in the treatment of fractures, both from the education of the undergraduate and of the graduate, organized in the larger centers of population in this country Regional Sub-Committees to assist it in carrying on this work. My old friend Dr. Charles L. Scudder of Boston, with whose classic book on fractures you are all familiar, is chairman of the General Fracture Committee of the College. Failing in his usual good judgment, he appointed me Chairman of the Minneapolis Regional Sub-Committee on fractures. I have asked to serve with me on this committee one representative of each of the accredited hospitals in Minneapolis and have added to this group a number of other surgeons who for want of better appellation might be termed free lances. Our meeting tonight and our meetings tomorrow are the first fruits of the efforts of this Minneapolis Committee.

We are fortunate in having here in the Twin Cities a member of the General Fracture Committee of the College. The last meeting of the General Committee was held in Chicago in January, 1932, and I take great pleasure in introducing Dr. Roscoe C. Webb, our local member of that General Committee, who will report to us in brief the proceedings of this last meeting.

Dr. R. C. Webb.—The Committee on the Treatment of Fractures of the American College of Surgeons was established by the Regents of the College to promote interest and general improvement in this increasingly important branch of surgery. The great advances in the standardization of the other branches of surgery during the past forty years have so interested surgical teachers that until recently the teaching of fractures has suffered. The sad story of fractures is being constantly related before our industrial commissions, when the victim is so fortunate as to have had his accident while employed, and the permanent disability ratings granted and the computations of costs in money make up a large portion of the commission's reports.

The American College of Surgeons' Year Book contains the reports of the Committee on the Treatment of Fractures and you have no doubt noticed that the fundamentals such as the teaching of fractures in medical schools, the minimal equipment for hospitals, accepted treatments for certain common fractures, the organization of regional sub-committees, and similar subjects have been included in these reports. The Committee functions through annual meetings of the Committee, through sub-committees, and through regional sub-committees.

The annual meeting of the General Fracture Committee of the American College of Surgeons was held early in January of this year in Chicago at the College of Surgeons building. The meeting was similar to our meeting now being held, in that it covered two days and consisted of reports of committees combined with clinics at the University of Chicago by Dr. Phemister and at the Presbyterian Hospital by Dr. Speed.

The Committee on Bone Plates and Screws reported the completion of their work for the present. Surgeons in various parts of the country had reported catastrophes resulting from the breaking of bone plates. Investigation showed that these were due to inferior material in the plates. This committee, in conjunction with the United States Bureau of Standards, has provided standards for manufacturers and certified plates and screws are now on the market.

The Committee on Medical Education in Fractures gave the results of one of the recent questionnaires to medical schools and described the teaching in one of the larger eastern medical schools. In the first year the students receive four hours in instruction on fractures, two hours when the work of dissection on the upper extremity is completed consisting of demonstration of prepared specimens with classical fractures with discussion of the surgical anatomy and the structures which may be injured, followed by illustrations with X-rays and clinical cases. A second similar two hours is given on completion of the dissection of the lower extremity.

In the second year a similar four hours are again given in connection with the studies in anatomy. Also in the second year twenty hours are devoted to fracture healing and pathology in connection with the course in pathology supported by experimental work and clinical cases.

In the third year the students are advised to secure the A. M. A. Primer on Fractures and are given the American College of Surgeons' Outline on Treatment of Fractures. Thirty-seven hours of instruction in fractures are given to small groups in the out-patient department and there are seven hours of instruction in the care of bed fractures.

In the fourth year there are fifteen hours of instruction on the wards in the bed treatment of fractures. In addition surgical clerks spend a few nights in the hospital to see the handling of acute fractures and an attending surgeon is required to come to the hospital for each case for the purpose of teaching initial diagnosis and treatment.

The Committee on Contact With the National Board of Medical Examiners reported that questions on fractures will be included in the examinations in surgery.

Ambulance equipment was also discussed and recommendations were made. It is probable that the ideal here will not be reached until all internes riding ambulances are thoroughly versed in the anatomical structures surrounding the fractures as well as the pathology, and will as a result become first-aid-minded, so to speak.

Physiotherapy was discussed and the opinion was expressed that early physiotherapy should be further developed.

Regional committees were reported upon and their further development was urged.

One session was devoted to work on revision of the Outline of the Treatment of Fractures which was published last spring. It is hoped that this volume can be published in an improved form in the near future.

The Committee on the Treatment of Fractures is now in the tenth year of its existence. The Minneapolis Surgical Society is now beginning its second decade. The coöperation of this society should insure much constructive work by the local region sub-committee in the care of fractures generally in this vicinity.

THE TEACHING OF FRACTURES IN THE MEDICAL SCHOOL CURRICULUM

DR. OWEN H. WANGENSTEEN

The impetus lent to surgery by its three greatest benefactors—anesthesia, asepsis and the Roentgen rays— have widened tremendously the borders and increased the scope of surgery. These agents have likewise been a great boon to the better and more intelligent handling of fractures. Everywhere, however, one hears echoed the criticism that fracture treatment has not exhibited the uniform improvement long since manifest in many newer chapters of wound management. Many who are qualified to know and have given the matter serious study say that fractures on the whole are badly managed.

Amongst other causes, one naturally seeks an explanation of this existing state of affairs in the curriculum of the medical school where the future practitioner establishes his first contact with the conduct of fracture cases. If one were to direct his inquiry concerning the teaching of fractures to the deans of our medical schools or subordinate officials more directly responsible for this subject, he probably would receive a fairly uniform type of answer. They would probably be the first to own that fractures like most other subjects in the curriculum do not receive the attention that the importance of the subject justifies. In event the interrogation came when the deans and their curriculum committees were brooding over contemplated increases in allotment of time to any of the divisions (a no small part of the Deans' worries) and the utter futility of adjusting the curriculum to everyone's complete satisfaction was quite apparent, the apology concerning the inadequacy of instruction in fractures might be qualified to this extent: The chief office of the medical

school is to equip the student with weapons with which he may intelligently approach his future problems. Medical training is a life-long process of education in which the young graduate has made only a start. The Medical School believes that if it has taught its students how to think that it has served its purpose well. We have sought to stimulate their interest and arouse their curiosity but not to satisfy it. We have not made finished artisans out of our students but we have furnished each with tools with which through constant effort he may become practised in their use.

The advent of cellular pathology which has contributed in such large measure to our better understanding of disease processes has stimulated a great interest in normal as well as pathological microscopic anatomy with a consequent lessening of intensity of interest in applied anatomy. Our predecessors who were called upon to reduce fractures without the aid of anesthetics were far better schooled in the knowledge of muscle antagonists than we. They were intimately concerned with the art of obtaining relaxation of the muscles responsible for the deformity. Though anesthesia has modified the problem greatly, I am persuaded that a good grounding in applied anatomy is just as essential today in the management of fractures. A knowledge of the mode and extent of muscle pull contributes definitely to a better understanding of the occurrence of fractures through the most frequent agency of indirect violence.

Zuppinger went to the anatomical laboratory in Zürich to investigate the force necessary to break the tibia by twisting. The laboratory "diener" informed him that he had taken over a very difficult task. It was found that four men could not break the tibia in this manner even though the foot was twisted off at the ankle joint. Sir Astley Cooper relates that when Damien was executed for the attempt to murder Louis XV, four horses were fixed to his legs and arms, and repeated ineffectual forced attempts for over fifty minutes were made to tear his limbs from the body. In order to effect this dismemberment and extinguish the doomed man's life, the executioners were obliged to cut the muscles and the ligaments near the trunk. The agency of muscle pull determines in large measure the facility with which fractures are seen to occur. Dislocations and fractures are more readily sustained in life than after death.

At the University of Minnesota two formal required courses in fracture instruction are given; one is an objective course of eleven sessions, each of an hour and a half in length in which cases are shown demonstrating the particular varieties of fractures under discussion. This course is given to the juniors, one division of the junior class being present each quarter. Two of the eleven weeks of the surgical clerkship offered to seniors is spent solely on fractures. Both these courses are given under Dr. Zirold's supervision at the Minneapolis General Hospital where an abundant fracture material is available and he is here to speak more in detail about the nature of this instruction.

Fracture instruction is also imparted, though in a lesser degree, in the courses of applied surgical anatomy, principles of surgery, regional surgery (orientation course), lectures on orthopedic surgery, the weekly clinics to juniors and seniors, the surgical Out-Patient Clinic, and in ward walks with the surgical clerks by the hospital staff.

There exists a large mass of knowledge concerning fractures, but one can not escape the impression that this information is not as well crystallized as that in other spheres of the surgeon's activity. The fundamentals of fracture treatment, viz., reduction, fixation, and assurance of good function need more emphasis. He who essays to treat fractures must learn to be the master of a method and not the slave of apparatus. Patients are not infrequently admitted to the hospital some days after the occurrence of a fracture with the note that the proper splint or apparatus was not available for handling it.

A stimulation of interest in fractures will undoubtedly contribute more to their management than any other combination of factors. With an increased field of activity has come a lessened interest in fractures and a tendency on the part of accomplished surgeons to turn this time-consuming group of cases over to their less experienced associates. Surgery is not a province with fixed boundaries. With advances in knowledge, some diseases once dealt with almost solely by operation are found to respond better to more conservative means of treatment, while others for similar reasons are surrendered by the internist to the surgeon. That which is essentially mechanical, however, has always remained surgical. Wound surgery, of which fractures constitute an essential part, has ever been the surgeon's domain. Whether fractures will remain a field of activity for the general surgeon or be taken over in large measure by reprisal by the industrial or orthopedic surgeon, the general surgeon's interest will chiefly determine.

Fractures constitute so great a portion of the injuries and accidents that it is highly important that a large number of well qualified individuals be prepared to deal with this important branch of surgery. The general practitioner has always been an important agent in the caring for fractures and his interest in an improved fracture program must be enlisted. In the care of those fractures in which the responsibility is great he should be counselled to seek skilled aid in their management from the start.

The recent graduate casting about for a field in which to divert his interest and equip himself by special training in surgery is not likely at present to become enthusiastic over fractures. He knows that the care of fractures demands constant attention and eternal vigilance and that the rewards of his labors in terms of hours spent is not great. He knows that his liability to a charge of malpractise is much greater in external injuries than when dealing with obscure internal complaints. Though mindful of the correlation between anatomical restoration and function, he sees juries placing undue emphasis upon the X-ray film. He hears of cases not settled on their merit but by debate in which physicians express seriously conflicting opinions over matters in which he sees little room for disagree-

ment. He notes that unprincipled colleagues and unscrupulous lawyers will for a fee distort facts and confuse issues that lead to a decision in which he sees no justice, and may even prove his undoing.

Possibly these are some of the evils that must be patiently tolerated temporarily but which will in the end clear some of the barriers and bring about the reform that must take place before young men will lend themselves wholeheartedly and without prejudice to this important chapter of surgery.

FRACTURE TEACHING AND ORGANIZATION AT THE MINNEAPOLIS GENERAL HOSPITAL

DR. A. A. ZIEROLD

The Minneapolis General Hospital has approximately 768 beds available for the service of charity patients. Of this, the surgical service comprises about 150 beds. Some fifty to ninety beds of these are usually given over to fracture cases. This constitutes a separate and distinct division of the surgical service and is administered and staffed as such. In the receiving wards there are fourteen to fifteen beds for such patients as require a short period of observation, but whose condition does not demand admission to the surgical wards. Added to this, the daily out-patient service admits the ambulatory cases for after treatment and physiotherapy.

The staff consists of a chief and three associates which change every three months. Of the attending staff one man is assigned to the fracture service and he and the chief constitute the senior staff of the service. It will be necessary to go a bit more into detail concerning the fellowship teaching and staff. We have, at present, five teaching fellows on the surgical service. At the end of six months we expect to have six. These are residents of the surgical service and are appointed for a period of three years. During the first six months of their residence, they are assigned to general surgical service with the duties of a first assistant and the responsibilities of the care of surgical patients. The second six months period is spent on the fracture service both in the hospital ward and in the out-patient department. During the third six months, the assignment comprises the orthopedic service and the receiving service combined. The fourth six months is made up of a similar receiving service combined with urology. At the beginning of his third year, the teaching fellow occupies the position of junior resident and is allowed to do minor surgery and such supervised operating as lies within his capacity as determined by the attending surgeon. During the last six months the teaching fellow as senior resident is permitted to do independent operating and to have the care of such cases as may be determined by the attending staff. During this last year the junior and senior residents act as advisors and supervisors of the men who are their juniors.

The interne organization as applied to surgery is composed of four men on a rotating service. Two of these men are assigned to fractures, and together with these two is another interne who is on a straight surgical service and who remains for six months on fractures and six months on general surgery.

The receiving service is staffed by one of the senior fellows and one of the senior residents who has passed through his general surgical service and through his fracture service, and who has at his disposal the attending staff man assigned to the service at that time.

The out-patient service up to recently has been cared for by teaching fellows, internes, and an assigned staff man. This will probably be changed with reorganizations of the dispensary and the out-patient staff. The department of physiotherapy is in the charge of a full time physiotherapist who cares for the patients within the hospital and such out-patients as require treatment.

Briefly, the fracture service is a distinct division staffed by the chief, associates, senior and junior fellows, and junior and senior internes.

The teaching of fractures to the students is undertaken both by lecture and by clinical demonstration. There are weekly lectures of one and one-half hour each in which bone injury, repair, methods of treatment of typical regional fractures, complications, and results are considered. These lectures are supplemented by individual case record, X-ray examination, and exhibition of illustrative cases. If the patient cannot be moved, the students are taken to the wards to inspect the case, its progress, and the manner of treatment. Following the completion of the assigned course of lectures, the student is assigned to a clinical clerkship devoted solely to fractures. This occurs during the senior year. During the time of a student's assignment, he is required to take case histories, make physical examinations, and observe and record the progress and treatment of his cases. Each day the student group is met by a staff man and some particular phase of fractures is taken up in the form of a clinical demonstration. Fractures are seen, too, by the student in the receiving ward and emergency calls are responded to as in other clerkships. Although no organized course of physiotherapy is given, an attempt is made to have the students observe the various forms and applications of physiotherapy. The surgical service and particularly the fracture service has been in a state of flux from out of which is gradually crystallizing a definite organization. I feel that it would only be fitting at this time to express a most heartfelt appreciation for the work of Dr. Charles Remy as superintendent of the Minneapolis General Hospital. By reason of his understanding and capacity for organization and accomplishment, not only the physical equipment of the hospital, but the morale of the personnel is at a higher point than ever before. This has been supplemented by the coöperation of Dr. Wangensteen who has afforded us a generous number of teaching fellows of most excellent quality.

Dr. Emil S. Geist discussed "The Minimal Requirements of the Average Hospital For the Care of Fractures," with the following conclusions:

A. Fractures can be, and have been, well taken care of with extremely meager physical equipment, if the

surgeon possesses brains, training, ingenuity, and mechanical fitness.

B. The most luxurious mechanical contrivance will not itself cure a fracture; it must be under the constant and intelligent control of the surgeon or of the orthopedic surgeon.

AMBULANCE EQUIPMENT AND PERSONNEL

Dr. Edward T. Evans

My assignment, "The Equipment Necessary for the First-aid Treatment of Fractures," assumes, I suppose, that I should speak of physical equipment.

I prefer to go further back in the treatment of our largest single industrial and machine-age accident result.

The old-fashioned bone setter treated many serious fractures as well and often better than some of us. They, at least, had instinct and mechanical sense on their side.

My contention is that all the physical equipment in the armamentarium of the most renounced fracture man is useless in the hands of a recent graduate or interne or country practitioner or general surgeon, unless he has that fundamental mechanical sense which tells him how to utilize it. And our specialists become dangerous when their armamentarium directs their method of treatment.

We have assembled here during these few days, not to improve ourselves alone, but to shape future policies with regard to fracture care in this district with the hope that we may mould others into the same line of thought. That means teaching,—a thankless task. Of course we have our brilliant student who follows our lead, who looks up to us and adopts our ways (perhaps that is why we think him particularly brilliant); but the average student is not so. Him we must so teach and direct that he develop a mechanical sense, a fundamental anatomical and functional understanding, and a stick-to-it-iveness that will follow his fracture through from the first aid to recovery. And we must instil in him the realization that sometimes his physical and mental equipment is insufficient and he must realize when he is over his head and should call for assistance.

I regret that my work leads me to the above conclusion. Not in a spirit of criticism but rather in an attitude of facing the facts and trying to drive home this thesis, I cite the following:

The first fracture I saw in this city was a subtrochanteric fracture treated first in a poorly fitting plaster spica by a man who could not use plaster (the first lesson a fracture interne should learn and it takes at least a month of daily plaster work to do so); then by skin traction which was inadequate at four weeks when it was applied. Open reduction was done the day following the removal of skin traction—in the presence of blisters. The patient died of osteomyelitis and amyloid degeneration after months of suffering.

I recently saw a traction of forty pounds applied to a Steinman pin in the os calcis for an old fractured shaft of the femur with two and one-half inches over-riding. Luckily the pin broke before the ankle and knee ligaments. The patient now has Kirschner pin traction through the femoral condyles with satisfactory reduction.

A fracture of the surgical neck of the humerus recently came under my observation. The fracture is beautifully reduced but the patient has lost two-thirds of her elbow motion from a Steinman pin insertion in the olecranon process.

A fracture at the base of the neck of the femur in a man of thirty-eight is now under my care with three and one-half inches over-riding and non-union because the spica was removed at seven weeks. The reduction was perfect, but the plaster had to be removed because a check-up X-ray showed the fracture had slipped in the plaster. Need I comment on that plaster?

A week ago I reduced an old Colles' fracture with terrific deformity which occurred in a man with a fracture of the neck of the femur. The Colles' fracture was not recognized. The neck of the femur was treated in a short leg spica, to above the knee!

These are extreme cases I admit, but as I look back over them I know that they were avoidable if we, as teachers, and this includes you older men who taught us younger ones, administer first-aid in the class room, the anatomy laboratory, the clinics, and then on the street and accident floor where the physical first-aid of the fracture commences.

What then are these physical agents for use in the first-aid treatment of fractures? Let me enumerate them briefly.

1. The fracture conscious interne.
2. Stretcher.
3. Warm blankets.
4. Tourniquet.
5. Sterile dressings and elastic bandages.
6. Four triangular muslin slings.
7. Four muslin bandages four inches wide.
8. Thomas ring splint for leg.
9. Thomas ring splint for arm.
10. Large soft pillows.
11. Basswood boards 30 × 4 × ¼ inches.
12. Safety pins.

Of all the above the Thomas splint is by far the most important and most useful, the use of which every interne should thoroughly understand. In an attempt to impart some conception of its usefulness, Dr. Wallace Cole devoted two full periods of senior lectures to this subject alone.

Do's:

1. Treat shock by keeping the patient warm and stopping hemorrhage, preferably by compression bandages.

2. Use the tourniquet without hesitation if necessary.

3. "Splint them where they lie" without moving them about.

4. Use the Thomas ring splint for all fractures above the middle third of the lower leg and above the mid-shaft of the humerus, using the wide muslin for applying traction as a double sliding loop.

5. Use the pillow and basswood boards applied as a box splint for the lower leg and ankle fractures.

6. Use a double triangle sling for elbow and lower arm fractures.

Don't:

1. Hurry.
2. Be rough.
3. Forget your tourniquet.
4. Forget your fundamental anatomy and physiology.

I plead for mental equipment, applied anatomy, applied common sense, applied follow-up and teaching in our hospitals by those who, by instinct and training, love fracture work and can so carry it out that it will prove an inspiration to our students, be they undergraduate or post-graduate like ourselves.

Dr. Myron O. Henry presented the subject of "Treatment of Fractures of the Vertebræ," with the following conclusions:

1. Any back injury may be a fracture, therefore X-rays are of paramount importance.
2. Those with back injuries should be transported face downward.
3. Deformity in crushed fractures of the vertebræ can and should be reduced as in other fractures.
4. In cases of fracture of the spine with complete paralysis, laminectomy *may* be indicated in the cervical region, is *usually* indicated in the dorsal region, and is *always* indicated in the lumbar region.
5. Most orthopedic surgeons are agreed that fusion operation offers relief in cases of long standing pain and disability after a compression fracture of the body of the vertebræ.

COLLES' FRACTURE

Dr. George R. Dunn

Colles' fracture, a fracture of the lower end of the radius, is frequently associated with a fracture of the styloid of the ulna, tearing of the ligaments of the wrist between the radius and ulna and faulty position of the radius and ulna at the lower radio-ulnar joint, and poor position of the ulna.

Reduction may be accomplished by any one of the several well known manipulations. X-rays after reduction should show that the angle between the articular surface of the radius and the shaft of the ulna forms an angle of 90° or less. Position may be maintained by anterior posterior moulded splints for about four weeks and in most cases careful movement may be commenced in about ten days under the direction of the surgeon. X-rays should be taken before and after reduction, before removing the splint and before resuming full time work. Reduction is usually indicated.

Conditions which may lead to impairment of function are: (1) conditions of the radial joint surface at the radio-carpal joint, especially irregularity; (2) the inclination of the joint surface at the lower end of the radius (normally 75-80° with the long axis of the radius); (3) position of the lower radial fragment; (4) position of the lower end of the ulna; (5) the condition of the radio-ulnar joint; (6) the amount of ligamentous damage and fracture of the styloid of the ulna.

Fifty cases of Colles' fracture treated by forty-eight different medical men which had been examined and X-rayed were reviewed and tabulated. The table shows:

1. The average disability was 14 per cent in hand and wrist.
2. In 74 per cent of cases the articular surface of the radius and the long axis of the radius formed an angle of over 90° (imperfect reduction).
3. In 26 per cent the angle was 90° or less (good reduction).
4. No disability in 24 per cent.
5. The fracture line involved the radio-carpal articulation in 46 per cent with an average disability of 16 per cent (about average).
6. In 8 per cent the radio-carpal joint surface was rough with an average disability of 20 per cent.
7. In 14 per cent, with about an average disability, the radio-ulnar articulation was not good.
8. In 24 per cent the angle between the radial articular surface and the long axis of the radius was distinctly bad (110-125°), and these cases averaged 22 per cent disability.
9. In 26 per cent of the cases, the angle was 90-75° and these averaged 5 per cent disability.

CONCLUSIONS

1. Colles' fractures are not being efficiently reduced.
2. A good reduction, 90° or less, will average about 5 per cent disability.
3. Poor reduction, angle of 110-125°, will average about a 22 per cent disability.
4. An uneven radio-carpal articulation frequently leads to a high disability, but the mere fact that the fracture involves the joint does not give a poor prognosis.
5. Fracture of the styloid plays little part in the disability except in an occasional case.
6. The position of the ulna, the condition of the lower ulnar articulation and ligamentous injury, all should be given attention but are not the most important factors in determining the ultimate result.

FRACTURES OF THE NECK OF THE FEMUR

Dr. O. W. Yoerg

Fracture of the neck of the femur may occur at any age, but it is essentially one of adult life. It constitutes about one-third of all fractures in persons passed 70.

The weakest part of the femur is the neck. The head receives its blood supply through the ligamentum teres and by circulation in the cancellated structure of the bone. In advanced years the vessels in the ligament practically disappear and the head of the bone must depend almost entirely for its blood supply from the spongy tissue of the neck. It is this lessened blood supply with a rarification of the bone due to advancing age that makes this fracture possible, and so often prevents union from taking place.

We are all familiar with the classical symptoms of a fractured hip. It must be remembered however, that a person may fracture a hip and still be able to walk about. It is always advisable in any injury of the hip in patients past middle life to have X-rays made, preferably sterescopic films. A thorough study of the films must be made, as even on excellent films a line of fracture can easily be overlooked. If a fracture does occur and has not been recognized, and the patient is allowed to be about, a breaking down of the fracture may occur and a definite deformity result.

Probably the most satisfactory method of treatment that we have today is the abduction treatment devised by Whitman. It is true that many fractures do not unite even with this method, but it is generally recognized as the method of choice at the present time, and it has been adopted by the fracture committee of the American College of Surgeons after much discussion and study.

X-rays should be made after reduction and application of the spica cast, and should be followed by further X-rays to check the position of the bones. Frequently the patient looses weight and the cast does not fit snugly, and at the end of four to six weeks a film will disclose absorption of the neck with a marked coxa vara. When this occurs the cast must be removed and other treatment instituted.

The abduction spica cast fixation should be used in most cases of fracture of the femur. It should be used in practically all of the young and middle aged, where the bones are impacted with deformity and where they are unimpacted. It may be used in many of the aged, but will require much care and nursing to avoid complications. Sound judgment should always prevail. An old person alive, even if disabled, may bring much happiness to his children and grandchildren, whereas his passing at the expense of a good surgical result, will bring only sorrow.

CARPAL INJURIES

Dr. Richard R. Cranmer

The most frequent injuries to the carpal bones are anterior dislocation of the semilunar, usually without but frequently with fracture, fracture of the body of the scaphoid and row-on-row dislocation. Dislocation of the semilunar bone can easily be missed unless a lateral X-ray view is taken.

Recent dislocation can be reduced by manipulation under the fluoroscope by hyperextension and then gradual flexion while traction is being exerted on the hand and pressure used over the dislocated bone.

Older cases (three days to a week) usually require volar incision and, after the bone is palpable, the same manipulation as described above.

Some few cases in which the volar ligament is torn, and especially if fracture is present, are best treated by excision of the bone.

Fracture of the body of the scaphoid is the most frequent injury in the carpal region and is best treated by approximation of the fragments if there be any malposition, and the application of a dorsal plaster splint from the base of the fingers to the elbow joint so applied as to hold the hand in slight dorsiflexion and slight ulnar abduction. This should be worn for at least six to eight weeks. Old cases with some absorption of the bone should also be so treated, but the splint should remain on for from four to eight months.

If approximation of fragments is impossible, the proximal fragment should be removed.

The usual mechanism of scaphoid fracture is strain having been applied with the hand in hyperextension or acute flexion. The two carpal rows flex on each other but the scaphoid, being so placed as to interfere with the transverse midcarpal joint line, bears the brunt of the force and breaks.

Row-on-row dislocation can be reduced, in most cases, under proper anesthesia and with adequate traction. Excision of a row of carpals, which has been advocated by some, seems too radical a procedure for this condition.

MEETINGS OF THURSDAY, FEBRUARY 4, 1932

On Thursday, February 4, 1932, Dr. Kellogg Speed, Professor of Clinical Surgery at Rush Medical College, Chicago, was the guest of the Minneapolis Surgical Society.

At 10 o'clock in the morning Dr. Speed conducted Fracture Ward Bounds at the Minneapolis General Hospital. At that time he discussed in detail cases presented to him by the Staff of the hospital. The discussion of each individual case was made in connection with X-rays taken before, during, and after treatment. He commented on the treatment and gave his ideas as to the latest principles of treatment in the individual case. This two-hour period proved to be most fruitful.

At 2 o'clock P. M. Dr. Speed addressed the medical students of the University of Minnesota in the Anatomy Amphitheater. Although the address was primarily for the medical school many visiting physicians attended. His address was on "Unhappy End Results in the Treatment of Fractures." In the course of this discussion he showed numerous X-rays of fractures both before and after treatment. His discussion brought out vividly the errors and mistakes which contribute to unfortunate end results. His talk could well have been entitled the "dos and don'ts" in fracture surgery. It was of more than usual value to medical students and to physicians.

At 6:30 o'clock P. M. the Annual Formal Banquet of the Minneapolis Surgical Society was held in the Nicollet Hotel. Dr. Speed was the guest speaker, and following the banquet, addressed the Society on the subject of "Fractures of the Neck of the Femur."

FRACTURES OF THE NECK OF THE FEMUR

Dr. Kellogg Speed

The subject of my talk tonight is something about the problems encountered in the treatment of fractures of the neck of the femur. You have probably all read the papers by Hey-Groves and Whitman given in London in 1929, covering the subject of fracture of the

neck of the femur; and if one has followed Whitman's work on the subject, he is inclined to feel that the last word has been said.

My message to you tonight is to stir up the subject and to see what your reaction is to it. There is possibly something deeper in the study of fractures of the neck of the femur than the mere exercise of the Whitman method of extension, inversion and abduction, and it is these additional points we must study.

The points I wish to make are two: (1) that the conservation of the natural blood supply of the head of the femur must be maintained to hurry any bony healing that is to take place, (2) that the reëstablishment of the old line or a new line of weight bearing trabeculæ in the neck of the femur must be obtained so that the whole limb will function; it being assumed that a first class reduction and proper position has been made and held by a suitable plaster dressing for a sufficient length of time. The time required for full bony union varies from six to twelve months and is aided by exercises of the limb and by judicious use, but not by injudicious weight bearing. If there is too much and too early weight bearing it jeopardizes the situation and may act untowardly. The final results will give bony union with retained blood supply in the head, no absorption of bone and strong weight bearing trabeculæ, but the question is when will it give it; and that is what I want to stir up interest in.

You know there are three or four sources of blood supply in the neck of the femur. These are the blood vessels from the diaphysis, from the epiphyseal arteries, from the periosteum and from or through the ligamentum teres. The blood vessels from the diaphysis of the femur come from the superior nutrient artery. It gives branches that may cross over the epiphyseal plane and enter the head of the bone. Second, the epiphyseal blood vessels enter the head in two directions and the periosteal supply is the richest of all.

These lantern slides show by a graphic method the blood supply of the head of the femur and the periosteal blood vessels in a rather massed group penetrating and passing up toward the head. If one takes a specially injected specimen from the cadaver one finds some of these diaphyseal vessels passing across the epiphysis into the neck and head of the bone, giving a rather rich blood supply in the head as a whole.

In the Whitman method of reduction of fracture of the neck of the femur the limbs must first be considered as lying parallel. The injured limb is drawn down until it is equal in length to the uninjured limb. The sound limb is abducted to its limit and the injured limb is then abducted until the two angles made by the legs with the body are equal and until the length of the legs is absolutely equivalent. After inversion of the femur reduction is accomplished. It is frequently necessary to lift up the femur on the injured side because it drops backward away from the head. The muscles will not allow movement of the thigh. The patient is put in plaster. I saw very excellent examples of this at the Minneapolis General Hospital. No one can do it any better. Whether to use a double or single spica is for you to decide for yourself. The patient's wants can be taken care of, bed sores can be avoided by frequent turning in this rigid plaster and he is quite comfortable.

Factors that help an effort at bony union in the neck of the femur as in any bone are immobilization and rest, proper food and other physiological elements which include some irritation, but not weight bearing which will break down the maturing trabeculæ.

This slide shows a case of fracture of the neck of the femur which was rayed within a few minutes after the fracture. In the roentgenogram lies much of the interpretation of the fracture, and the exact requirements of the reduction, *i.e.*, what you want to do. The patient is put to sleep and the bone is put in position and you look forward to a reasonably happy outcome. You may or may not get a good result.

Six weeks later, while the patient is still in plaster, you should re-ray the fracture to study the decrease in density of the head as compared with the opposite head. Any X-ray shadow of the skeleton is dependent on the amount of calcium in the bone because the principal shadow-making material is the calcium salts. You study the head to see whether its density varies as compared to surrounding osseous structures. This film was taken six and one-half weeks after fracture and it looks as if the head is viable because, had it died, it would have become necrotic and it would retain the density as of the day it died and throw a shadow much darker, surrounding bone having lost calcium from atrophy of disuse.

Turning to the mechanical side of fracture in healing after the break is reduced and the head remains alive, the trabeculæ develop and after a given number of months, 6, 8, or 12, with judicious use, the trabeculæ finally line up and we have a head of equal density with the trochanteric portion. We then know we can depend on the union when the patient starts to walk.

This film is of a man 58 years old who fell down and broke the neck of his femur. Within an hour and a half after fracture I put him into plaster. This is six months later as it appears on X-ray examination. It looks to me as if the density of that head were very satisfactory. Here, one month later, the trabeculæ line up again. This is another month later, and the result looks very happy. Here it is four years later. The density of the head seems to me equivalent to the other; that head looks viable to all tests of the X-ray, and the patient is walking about and going to his business.

Some cases do not act that way. Probably the blood supply of the head remained in this instance but some of these fractures later unite and develop pain, lameness and possibly additional shortening. The causes of this are:

1. Insufficient period of immobilization.
2. Too early weight bearing, usually without the help of the caliper.

Other minor causes are:

1. Excessive body weight.
2. Condition of the vascular system.
3. Impaired myocardial action.
4. Poor nourishment.
5. Endocrine disturbances.

These fractures are not confined to older people,

but fractures of the neck of the femur occur in children. These pictures are of a young boy with epiphyseal separation. This epiphysis was separated when the boy was wrestling with an older person and I made this reduction. It looks to me as if it were fairly satisfactory. He was kept in plaster sixteen weeks, and was then put in a caliper for four and one-half months. About a year and a half later he was sent away to military school and was subjected to serious over-training, over-walking, etc., as a part of the discipline to which he must conform. He came back in two years with a limp. I found when I came to X-ray it that there was an irregular shaped head and thickening angulation in the neck. He had pain. Immediately he was taken out of school and in spite of my best efforts this head went on to further destruction. Three months later, on X-ray examination of the head we found it was flattened, spread out, and light spots of bony replacement existed in it. Six months later, although he wore a caliper there is still some dark area in the head. No doubt that head is undergoing absorption and breaking up into fragments. Nine months later, in spite of wearing the caliper there is flattening, a change of configuration, and a little narrowing of the head portion. This is a graphic story of that case for four and a half years.

The next picture is taken eight years after the fracture through the epiphysis and we see that the neck is thickening; there is some new bone formation around the trochanter. The boy is in school but can't play football and can't engage in sports. There may still be dead unreplaced bone in that head. He had all the attention that the surgeon could give him.

It is difficult to get autopsy specimens of fracture of the neck of the femur and in twenty years' endeavor I have not had very many. This photograph is an impacted fracture of the neck of the femur occurring simultaneously with a fracture of the shaft. The shaft fracture has healed; it has abundant firm callus. The head of the femur, however, is not very firmly attached. The cartilage looks pretty good. On the whole, the head looks reasonably viable and yet after four and a half months the neck does not seem very well healed. On cutting through the specimen here is the healed shaft fracture; the medullary cavity is filled with callus. It looks well united. But the neck and head look different and there is no strong union, no rearrangement of the trabeculæ. We X-rayed that head, and in this picture we see the head with its density in the central portion largely that as of the day of injury. Here are some old trabeculæ; here is new bone formation, or at least invasion of bone. The main part of the head is dead; there doesn't seem to be a real bony union. The fracture plane is not thoroughly united; there is a lot of replaced bone, representing nearly a half or a third of the head. The fracture plane and head present an aseptic necrosis back from the fracture edge.

Another specimen recovered 6 and one-half to seven months after fracture, at which time the patient died, shows that the head has undergone some replacement; the cartilage does not show very distinctly. This replacement has not built itself into the firm trabeculæ that could stand wear and tear.

Shall a head showing areas of dead bone be removed or be used in a scheme of treatment which contemplates its complete final replacement and ossification? What I want to bring before you is a study of the bone that will help us in prognosis and treatment.

When we come to the treatment of ununited fractures we have to consider:

1. Direct treatment of the fracture, body plaster of Paris, after extension, inversion and abduction of the leg even if the head is dead.
2. Active treatment for
   a. Incipient ununited fracture.
   b. Established ununited fracture.
   c. Separation of fragments or true nonunion.

Our mainstay of help in these cases is the walking caliper, which is the best friend we have while waiting for these changes to go on.

Is there not something more in fractures of the neck of the femur than sheer mechanical apposition? Is there something more than reducing it under the Whitman maneuver? We must admit, however, that this method of treatment is perhaps the best yet devised, but we must prolong our investigation of the progress of these cases and there should be checking X-ray control during the course of encasement in plaster and after the patient is removed from the dressing. If ununited fracture with failure in trabecular alignment develops or the head shows evidence of aseptic death a prolonged freedom from weight bearing must be indicated. My purpose then is to stimulate you into further study of your fracture cases looking towards the betterment of treatment in general and of this particular type especially.

The banquet was well attended and there were many out-of-town guests.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of January 13, 1932

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, January 13, 1932. Dinner was served at 7 o'clock, and the meeting was called to order by the President, Dr. J. S. Gilfillan at 8 o'clock. There were 57 members present.

Minutes of the December meeting were read and approved.

Annual reports of the Secretary-Treasurer were read and approved.

The Academy voted to offer, through the Board of Regents, an annual prize of $100.00 for the best piece of original research work of an undergraduate student of the University of Minnesota; the prize to be awarded by a committee selected by the Dean of the Medical Sciences, one member of which committee

shall be a member of the Minnesota Academy of Medicine.

The President appointed a committee to draw up resolutions on the death of Dr. H. Longstreet Taylor, who died January 2, 1932.

Upon ballot, Dr. C. N. Hensel of St. Paul and Dr. F. H. K. Schaaf of Minneapolis were elected to Active membership in the Academy.

Dr. Gilfillan then called the President-elect, Dr. J. C. Litzenberg, of Minneapolis, to the chair.

DR. LITZENBERG: I would be ungrateful indeed if I did not seize this occasion to voice my grateful appreciation of the honor you have shown me by electing me President of this Academy. Honors may be real or not, as the occasions indicate, but when one is elected to preside over a society of the character of the Minnesota Academy of Medicine by his intimate colleagues who know his faults, it is an honor indeed.

I am now pleased to introduce to you the retiring President, Dr. Gilfillan, who will give his President's Address on "Compulsory Sickness Insurance."

DR. J. S. GILFILLAN (St. Paul) then read his Address, to appear in MINNESOTA MEDICINE at a later date.

DISCUSSION

DR. E. L. GARDNER (Minneapolis): Is it coming here?

DR. GILFILLAN: I think quite surely within not too long a time it is going to come up for consideration. Of course the United States is different from Europe. Very likely it will come up in the states. Social insurance has already gone quite a ways in the United States; we see that in various lodges, industrial plants, etc. All these social insurance instances are predecessors of compulsory insurance, but I think it will be a long time before it is universally applied in this country. It will come up for discussion at least, but whether or not it will be accepted I don't know. The American Dental Association has investigated this quite thoroughly; they have raised funds and sent representatives to Europe to study the various systems over there, and they are quite ready for it. The medical profession should get in on it so that they will have something to say about the framing of the laws and the administration of the scheme. In Germany it is probably more unsatisfactory than in any other country but of course Germany is very poor anyway and one can't apply that to the United States. I am quite sure that we will see the thing brought up and I think we should be prepared for it.

DR. H. B. ZIMMERMANN (St. Paul): In those countries in which the scheme is apparently quite satisfactory to the doctors, isn't that due entirely to their loyalty?

DR. GILFILLAN: It is due mostly to the organization, which has gotten in early enough. Another thing that helps a lot is the number of doctors. Norway, for instance, has one doctor to 1,900 population; so there it is easier to make it satisfactory than it would be in the United States where there is one doctor to every 750 of population. The total income per capita is less if there are two or three doctors to support in place of one.

DR. C. B. WRIGHT (Minneapolis): This is an exceedingly interesting and timely paper. I regret that Dr. Gilfillan did not have time to discuss the condition of the hospitals in these various countries. In Scotland, according to the best information I could get, the panel doctors are not permitted to do anything but the simplest emergency surgery. Cases needing operations and hospital care are sent to public hospitals. The staffs of these hospitals do the necessary work without compensation. In Sweden and Norway I have been told the hospitals are under the control of the state and the men are employed full time, in most cases receiving very small salaries. In fact at one time the medical association had to raise a large sum of money to support doctors who would refuse salaries below a certain point. In England the only income the surgeons get from private patients is where the patient is operated on in the surgeons' nursing home.

In this country, if the present method of building hospitals to give free hospital and medical care to veterans of all wars is continued, we will have much the same situation as far as hospitals are concerned. The Veterans' Administration has recently outlined a policy calling for the building of over 100,000 hospital beds in addition to the some 42,000 beds which they now control.

DR. GILFILLAN: In Sweden there is no compulsory insurance but there the medical society is pretty tight and also the number of doctors is quite low, about 1 to 2,800. Doctors are stronger when not too numerous. Sweden is under a voluntary system; but in Sweden the doctor himself cannot make a contract without the consent of the organization.

DR. A. E. WILCOX (Minneapolis): You spoke of Lloyd George as being the man who put over the system in England, and the act becoming a law before the doctors knew anything about it. From what source did the plan originate?

DR. GILFILLAN: In the first place a lay committee was appointed. But Lloyd George was really the man who put it over with the representatives of the insurance companies. The insurance companies had the scheme all framed before the doctors knew anything about it.

DR. R. E. SCAMMON (Minneapolis): It seems to me that the problem here presented is the one that we are always facing with regard to insurance and pensions. Everywhere we are trying to get too much for too small a contribution on the part of the insured. I once had occasion to take up an insurance plan with the President of a University and received a typical answer. He said, "There are two objections to your plan: first, it costs too much, and second, you are not providing large enough pensions." In practically all insurance plans we do not collect enough money and therefore we take it out of the profession; later somebody has to suffer.

I would like to emphasize also the point Dr. Gilfillan brought out about the number of practitioners, 750 individuals per practitioner in the United States. Last year I had occasion to figure out how fast practitioners were increasing. I discovered that they are increasing five times as fast as the population is growing, and that for every four men who were graduated from our institutions, one from a foreign institution is admitted to practice.

DR. LITZENBERG: In 1918, in my address as President of the Hennepin County Medical Society, I warned the medical profession that the socialization of medicine was surely coming and the degree to which it comes would depend upon the control of it by the medical profession, by studying the situation, and, as Dr. Gilfillan has indicated in his talk, by the profession taking control and have it governed by the profession and not have it forced upon us by lay agencies.

The meeting adjourned.

R. T. LAVAKE, M.D., *Secretary.*

PROCEEDINGS OF THE MINNESOTA SURGICAL SOCIETY

Meeting of October 23, 1931

The October meeting of the Minnesota Surgical Society was held in the Todd Memorial Amphitheater of the University Hospitals on Friday afternoon, October 23, 1931.

The meeting was called to order at 2:15 by Dr. Owen H. Wangensteen. The meeting was turned over to Dr. O. J. Campbell, who presided over the following scientific program:

"Tuberculous Empyema," a paper by Thomas J. Kinsella, M.D., F.A.C.S., and E. P. K. Fenger, M.D., Glen Lake Sanatorium, Oak Terrace, Minnesota, was presented by Dr. Kinsella.

Tuberculous empyema may develop in one of four general ways: (1) as a late development from a primary pleural effusion; (2) as a result of dense pleuritic involvement during or subsequent to a tuberculous pneumonia, oftentimes mistaken for a non-tuberculous empyema complicating pneumonia and treated accordingly; (3) as a complication during the course of artificial pneumothorax induced in the treatment of pulmonary tuberculosis; (4) from the spontaneous rupture of a tuberculous abscess or cavity into the pleural space either with or without a preceding pneumothorax. This latter type is almost always complicated by secondary infection. The first two of these are not seen frequently and are not usually recognized as tuberculous in origin, and are treated as non-tuberculous empyema, and a true diagnosis is not made until persistent draining sinuses call attention to a possible tuberculous background, or microscopic examination of tissue or guinea pig inoculation of the secretion eventually tells the true story.

In tuberculosis work, the type of tuberculous empyema most frequently encountered is that which develops during the course of artificial pneumothorax for treatment of pulmonary tuberculosis. Here, because of tuberculous involvement of an area on the visceral pleura, an effusion develops, usually clear at first with a low cell count, gradually or suddenly increasing in severity and amount until a purulent fluid is formed. The development of such a process may be gradual and silent, or sudden and stormy with fever, rapid pulse, chilliness, general malaise, etc., usually interpreted by the patient as an attack of grippe. Fluid soon appears in the pleural cavity discovered either by physical or fluoroscopic examination, or by the presence of splashing which the patient hears or feels. The purulent effusion represents a later stage or a more intense reaction of the same process which produces the clear pleural fluid. The fluid itself may vary all the way from a slightly cloudy or smoky fluid with a cell count of a few thousand to a very thick greenish or yellowish pus with cell count ranging from many thousand to several hundred thousand or more, depending upon the intensity of reaction and the time the fluid has remained in the pleural cavity. Tubercle bacilli may be easily demonstrated on smear in some fluids, while in others they can be found only with difficulty or by means of guinea pig inoculation. The patient, after the first reaction to the formation of the effusion, may have few or no symptoms aside from the weight and the splash of the fluid, but may feel toxic as long as pus is present.

Tuberculous empyema developing subsequent to spontaneous rupture of a tuberculous abscess or cavity into the free pleural space is almost always accompanied by sharp reaction, both from the sudden shock and embarrassment which follows the sudden collapse of the lung and from the marked inflammation which follows the massive contamination of the pleura with tubercle bacilli and secondary organisms. Fever, constitutional symptoms and prostration rapidly follow and the patient becomes very ill within a short time after its onset. The bronchial fistula may remain open, may close promptly, or may develop a check-valve action preventing the escape of air forced into the pleural cavity during paroxysms of cough, and by the positive pressure maintained greatly embarrass the patient mechanically by pressure upon the heart, mediastinum and diaphragm, or displacement of these structures.

In the treatment of tuberculous empyema without secondary infection or without artificial pneumothorax, three points are of prime importance: (1) evacuation of the pus; (2) obliteration of the pleural space; and (3) the avoidance of secondary infection. Open drainage by rib resection or catheter must never be used in this group of patients, for to do so will not only interfere with expansion of the lung and obliteration of the pleural cavity, but will allow the entrance of secondary infection, which must be avoided. Prolonged suppuration from any source is followed by degenerative changes of a lardaceous type in various organs. For this reason, we advise frequent removal of the purulent secretion from the pleural pocket through a needle and the washing of the pleural cavity with sterile saline, being careful always before withdrawing the needle to be certain that it contains no pus to contaminate the needle tract. A wide variety of antiseptics have been used but have gradually been discarded in favor of normal salt solution. If the lung is extensively collapsed at the time the empyema develops, it should be re-expanded so that it is at least half way out to the chest wall before it becomes bound down in order to facilitate subsequent obliteration of the pleural space. If the underlying disease in the lung itself has healed sufficiently to permit complete-expansion of the lung, then this should be done without delay for the final healing of a tuberculous empyema is dependent upon the complete obliteration of the pleural space. A few empyemas, after a period of aspiration with partial reexpansion of the lung, subside and do not recur. Others subside but recur at a later date, weeks or months later. If the patient's general condition and the disease process in the contralateral lung will permit and the lung cannot be expanded to meet the chest wall, the final solution to the difficulty is complete obliteration of the pleural space by extrapleural thoracoplasty, bringing the chest wall down to meet the partially expanded lung, with aspiration of all air and fluid. Complete obliteration of the pleural cavity can be proven by repeated physical and X-ray examination over a period of months or even years, supplemented by attempted aspiration of any suspicious area. Residual pockets, unrecognized, will eventually drain themselves as the tension increases either by perforation of the lung with drainage through a bronchus or by perforation of the chest wall. If, after maximum collapse has been obtained by a complete thoracoplasty, posterior plus anterolateral, an empyema pocket still remains, its roof should be totally removed, leaving no overhanging edges, and the pocket packed with gauze and allowed to heal by granulation.

Tuberculous empyema with secondary infection without bronchial fistulæ may be sterilized by the use of dyes, of Dakin's solution, or other antiseptics, and treated along the same lines as the uncomplicated tuberculous empyema. Tuberculous empyema with secondary infection with bronchial fistulæ is probably best treated by preliminary open drainage first, by catheter if the patient is desperately ill, later by rib resection placed as far laterally as possible so that it will not subsequently interfere with posterior thoracoplasty. With free drainage, sterilization is then attempted, being extremely careful to prevent entrance of any irritating antiseptic into the bronchial fistula. The lung is allowed to expand as much as it will. At a subsequent date, when the patient's general condition and the condition of the contralateral lung will permit, the pleural cavity is to be obliterated by a complete radical

extrapleural thoracoplasty to be followed if necessary by an unroofing of any uncollapsed pocket.

DISCUSSION

DR. O. H. WANGENSTEEN (Minneapolis) felt that Dr. Kinsella had stressed very well effectual obliteration of the pleural cavity as an important element in achieving success in tuberculous empyema. But in general hospital practice perhaps the type of tuberculous empyema more frequently seen is that type in which there is no manifest evidence of tuberculosis present. Within recent months Dr. Wangensteen had observed two cases of this sort and he had been somewhat chagrined when he thought he had cured the patient of the pyogenic infection to find later on that the patient also had tuberculosis. The case histories of two such patients were related and the X-ray films were demonstrated.

The first patient was a girl of 20, in good nutrition, admitted to the University Hospital in 1931, with dyspnea and considerable fever. There was a draining sinus in the left chest and the patient gave the story that she had had an acute illness followed by empyema in September, 1929. Following the establishment of drainage at that time the patient improved very much and was quite well up to her recent illness. On admission here a catheter was passed into the sinus after slight dilatation of the latter with a hemostat. Irrigations with Dakin's solution were made and there was a complete subsidence of fever and dyspnea. An X-ray film of the chest at that time failed to show any evidence of parenchymal lesion in the lung. There was no sputum. Collapse of the rather large pleural cavity was undertaken by a combination of rib resection and decortication. Two such operative procedures were done before complete and satisfactory closure was obtained. Tissue excised from the pleura at operation showed giant cells and the pathologist suggested the diagnosis of tuberculous empyema. Later the guinea pig inoculation made from the pus aspirated from the sinus on admission of the patient was reported positive for tuberculosis. The patient has remained well.

The other patient, a boy of twenty-four, was admitted in June, 1931, with a history of severe sepsis of seven weeks' duration. His illness was sudden in onset and a diagnosis of a pyogenic empyema of the right pleural space had been made by his physician. A serous type of exudate with intermixture of large clumps of fibrin was obtained on aspiration. After drainage following rib resection, the course remained unaltered. The fever continued high, ranging between 102° and 103° F. daily with an occasional excursion as high as 104° F. and punctuated occasionally by chills. On July 10, another rib resection was done because of suspected pocketing of pus at a lower level in the thorax. The fever persisted unabated. The patient had continually complained of considerable pain in his chest and there had been marked tenderness along the incisions. The tenderness finally localized itself to the inferior portion of the scapula and though the X-ray films of the scapula exhibited no demonstrable lesion, it was believed that an osteomyelitis was present and the lower third was excised. The patient's condition immediately improved and a striking decline in the temperature to normal occurred. Pain ceased at once and the patient became ambulant and promptly gained weight. Tissue from the scapula removed at operation showed tuberculosis and the guinea pig inoculation with fluid obtained on admission was returned positive for tuberculosis. The patient has continued to do well and has been sent to a sanatorium for bed rest.

Dr. Wangensteen said that he would like to ask Dr. Kinsella if he sees cases of this sort and whether he has had similar surprises.

DR. D. G. GARDINER (St. Paul) suggested taking out a piece of the pleura at operation.

DR. WANGENSTEEN stated that in the two cases just cited pieces of pleura had, of course, been removed at operation, but the evidence obtained appeared to be in total conflict with the clinical, roentgenologic, and operative findings in each case. In the instance of the first patient who had a pleural fistula and had worn a drainage tube, he had been inclined to believe that the histologic evidence could be correlated as well with a foreign body reaction.

DR. J. F. NOBLE (St. Paul) said he wished to say that from a histologic standpoint it is not always easy to be sure from a biopsy that one is dealing with a tuberculous lesion unless tubercle bacilli can be stained in the tissue. Frequently foreign body reactions closely resemble tuberculosis and at times the inflammatory reaction is non-specific in character.

DR. T. J. KINSELLA (Oak Terrace) thought that the type of patient mentioned by Dr. Wangensteen represented an example of tuberculous empyema of Group I or II as mentioned in his paper. These patients usually present a picture of an acute non-tuberculous empyema and are treated as such until the chronicity of the disease, or the persistent draining sinuses, or the character of the discharge called one's attention to the possibility of a tuberculous process. He felt that it was pretty well proven that tuberculous empyema of this type develops secondary to a small lesion in the parenchyma of the lung or in the tracheobronchial lymph nodes and are not primary infections of the pleura itself, even though clinically the underlying lung lesion cannot be demonstrated. He stated that the clinical methods of determining small tuberculous foci were rather crude and that one may be greatly surprised when viewing the pleura through a thoracoscope, or at postmortem examination to note the extensive tuberculous involvement present, when clinically there was nothing to show for it except a small clear pleural effusion.

DR. O. H. WANGENSTEEN (Minneapolis) read a paper on "Chronic Occult Encapsulated Empyema." Two patients were shown, together with the X-ray films. The first was a man aged forty-eight who became ill in April, 1931, with pain in the lower right chest. Fever and cough followed and the patient soon began raising sputum in fairly large quantities. There was occasional blood-streaking of the sputum. He lost 20 pounds in weight and was unable to continue at his work. When admitted on the Medical Service at the University Hospital there was considerable sputum, often as much as 400 c.c. a day, with signs of consolidation in the lung. The latter findings gradually subsided but sputum continued in lesser amounts. The sputum was negative for tubercle bacilli but contained elastic fibers. Occasionally there would be very little and again considerable would be expectorated. The patient's condition improved somewhat but the fever continued between 100 and 102° F. and there was no gain in weight. The roentgen evidence of consolidation in the right chest gradually diminished but did not clear entirely. The patient also had syphilis with a positive Wassermann reaction and an aneurysm of the transverse arch of the aorta. After repeated aspirations of the chest a purulent exudate was obtained beneath the scapula posteriorly in which streptococci and pneumococci were identified. A lateral roentgenogram also demonstrated the residual shadow in the chest to be in the posterior portion of the chest. Pus was aspirated from the right main bronchus on bronchoscopic examination, but the findings were otherwise not conclusive as to the source of pulmonary suppuration. A diagnosis of encapsulated empyema was made and rib resection was done. As the pleura was cut down upon, it appeared quite normal. The pleura was then gently pushed away from the ribs and followed in the direction in which it appeared to increase in thickness. It was then incised and a surprisingly large quantity (a pint or more) of pus was obtained.

The patient has demonstrated considerable improve-

ment and has regained his former weight. The wound in the chest has closed and the lung appears to have expanded. Sputum is still present and varies in amount from 30 to 50 to occasionally as much as 200 c.c. in twenty-four hours. A lipiodol filling of the bronchi shows a fairly well developed cylindrical bronchiectasis of the lower lobe bronchi on the right. The aneurysm displaces the right bronchus backward considerably and its lumen appears very much narrowed. A phrenicectomy will undoubtedly permit the diaphragm to rise somewhat and compress these dilated bronchi, despite the apparent fixation of the diaphragm by the previous empyema.*

The second patient was a man aged 36 who went through a severe pneumonia in January, 1930. He was in bed one month at the time and gradually got up and resumed his work after a few months. He lost 48 pounds in weight and did not appear to recover his former strength; a mild cough also persisted. Six months after his initial illness, his physician recovered pus on aspiration of the chest and a rib resection was done followed by prompt improvement. The wound closed and the patient continued at his work, never completely regaining his strength or weight. He continued to raise sputum in small amounts and periodically would cough up a good deal. Just before admission to the University Hospital the sputum had on several occasions been blood-tinged.

The patient ran a low grade fever and exhibited the physical finding of a thickened pleura over the right chest. Despite the fact that breath sounds were not audible over the lower right chest, the heart sounds could be distinctly heard there and more clearly than in the left axilla. The X-ray findings were those of thickened pleura with a suggestion of a small effusion. Examination of the sputum for tubercle bacilli and elastic tissue was negative. No exudate was obtained on aspiration. The findings here were so suggestive of encapsulated empyema that bronchoscopy was omitted. A diagnosis of encapsulated empyema with bronchial fistula was made and rib resection was done under local anesthesia on August 8, 1931. As in the previous case, normal pleura was at first cut down upon, but when followed in the direction of increasing thickness pus was immediately encountered upon incising the pleura. About 80 c.c. of fluid could be instilled into the cavity a few days after operation; it has gradually decreased in size, however, and the drainage tube in the chest has been withdrawn until it now only extends through the parietes of the chest wall. The patient states that he has regained his usual vigor and feels quite well.

These two patients, Dr. Wangensteen stated, represented not an uncommon type of case. The patient often presents himself for the treatment of pulmonary suppuration. The presence of the bronchial fistula in such cases aids in directing the attention of the physician to the chest but at the same time it gives rise to confusion of the existing empyema with lung abscess and bronchiectasis. Dr. Wangensteen felt that a careful evaluation of the history, the physical findings, the sputum and the roentgen films should lead to correct recognition of such cases in most instances.

In the second patient, the audition of the heart sounds over the right chest where breath sounds were inaudible was interesting. Fluid is a better conductor of sound than air and it is not unlikely that this may prove to be a fairly constant finding in pleural effusion and exudates of one sort or another. Heart sounds may often be heard over the lower abdomen in peritonitis in which a gaseous and fluid distension of the bowels together with the presence of a fluid medium between the coils of bowel serves as a good resonator for sound transmission.

An antero-posterior and a lateral film of the chest serve as the best indication for the location of the incision in the absence of a conclusive needling of the chest. Thickening of the pleura at operation suggests a proximity to the purulent encapsulation. Dr. Wangensteen urged operation and exploration of the chest in such cases to rid the patient of his continued pulmonary suppuration.

*A phrenicectomy has been done, following which there was a material reduction in the expectoration.

DISCUSSION

Dr. T. J. Kinsella stated that these cases of occult or localized empyema were interesting not only from the standpoint of diagnosis but also from the standpoint of treatment. They not only are frequently not diagnosed, but quite frequently misdiagnosed. He recalled one seen recently which had been diagnosed as lung tumor in which the early history was certainly indicative of empyema rather than of pulmonary malignancy. He mentioned another seen recently with typical history of pneumonia followed by empyema in which, because of a few unsuccessful attempts at aspiration, the diagnosis of empyema was discarded. When seen in consultation, two circumscribed pockets were localized by physical examination and pus obtained from both through an aspirating needle. The underlying principle in the treatment of this type of empyema is obliteration of the pleural space after evacuation of the pus by expansion of the lung to the chest wall if possible, because the lung itself is normal or relatively so in contra-distinction to many cases of tuberculous empyema in which the underlying lung is badly diseased with tuberculosis which demands a lung collapse and the obliteration of the pleural pocket by collapsing the chest wall down to meet the visceral pleura.

Dr. Wangensteen agreed with Dr. Gardiner that bronchoscopy was a valuable agent in the differential diagnosis of chest condition but stated that in suppurative lesions the findings were often indefinite and he was of the opinion that a careful interpretation of a well-taken history aided materially in getting properly orientated in such cases. Here were two patients, both of whom apparently had had pneumonia. The continued illness in either instance may have been due to lung abscess or empyema. In lung abscess there is usually considerable sputum continually; but if an encapsulated empyema with a bronchial fistula be present there is often a lot of sputum expectorated periodically with intervals during which only a little sputum is raised. With the ordinary criteria which everyone has at his command, these cases should be correctly recognized in most instances. The sputum of lung abscess usually exhibits elastic tissue; that of encapsulated empyema with bronchial fistula usually not. Both of these patients finally did well, but unnecessary suffering and considerable time could have been saved them, particularly with the last patient, by an earlier intervention.

Dr. Wangensteen stated with reference to Dr. Kinsella's remarks on carcinoma of the lung and sepsis that he too had seen several cases such as these in which the patient appeared to have a pulmonary suppuration. In one instance he operated upon a patient for lung abscess and the patient had twice previously been operated upon elsewhere with the idea in mind that he had pulmonary suppuration. Only shortly before the death of the patient was it even suspected that he might have a carcinoma of the lung. One common mode of manifestation of carcinoma of the lung, Dr. Wangensteen felt to be that of a pulmonary mass as visualized on X-ray examination accompanied by fever and chills. Sputum may or may not be present. The loss of weight is usually impressive and the patient often presents the appearance suggestive of malignancy. Within the last year he has seen three such cases, all of which were correctly diagnosed when first seen. However, Dr. Wangensteen said, one can take little pride in recognizing them when so little can be done for them.

DR. DANIEL H. BESSESEN (Minneapolis) read a paper on "Certain Dangers From Spinal Anesthesia; thrombo-embolic disease, postoperative hemorrhage, sudden death, the exhausted or debilitated patient."

There are certain diseases or conditions occasionally referred to in the literature which cause peculiar dread and assume, in some cases, the proportions of the mysterious. These are thrombo-embolic disease, post-operative hemorrhage, sudden death and the effects of surgery upon the exhausted or debilitated patient. We have all had occasion to experience or draw conclusions concerning each of these complications, during or following the administrations of other anesthetics, but it may be well to consider them from the standpoint of spinal anesthesia.

Thrombo-embolic disease is one which at varied times causes death in from 0.1 to 0.5 per cent of all patients and occurs in all types of cases, most often appearing among otherwise healthy individuals, in clean as well as infected surgical cases, in all ages of life. It is possibly slightly more common among women, and favors patients with mild or long-standing infections. Giertz and Crafoord believe it to be essentially a surgical disease, finding a ratio of embolism between cases treated surgically and similar cases non-operated of 1 to 5.3. A. W. Meyer at the Charlottenburg Krankenhaus in Berlin, however, observed as many cases on the medical service as on the surgical. Bunzel reported 32 cases in 31,715 labors, though he reported it more frequently in operative deliveries than in spontaneous. So it may occur in surgical, obstetrical or medical patients.

There seem to be certain veins which are more susceptible to thrombo-embolism than others. Eighty-six per cent of all thrombi occur below the diaphragm, approximately 50 per cent in the left femoral vein. Other locations predisposed are the pelvic plexus of veins, the venous network of the dura mater, the auricles and prostatic vessels. Vessels in which the supine position causes a release of the overpressure observed in the upright position, produced by either blood or viscera, are especially predisposed. A widening of the vessel as in the auricles and in the veins at each valvular sinus, the possibility of a backward pulsation in the veins, the crossing of the left femoral vein by the inguinal ligament, the left hypogastric artery and the right common iliac artery are anatomic facts of importance in the etiology of the disease.

Aschoff places importance upon four possible factors, one or all of which may play a part in the production of the spontaneous thrombus changes in: (1) blood plasma; (2) blood elements; (3) the blood flow; (4) the vessel wall.

The mechanism of thrombus formation as gradually derived from the work of Virchow, V. Recklinghausen, Ferge, Aschoff, and others, seems to show that the platelets are deposited on the bed of the vessel as sand is piled on the bed of a stream in response to changes in its current such as whorls or eddies. Fibrin attaches to these hillocks. The leukocytes, being lighter than the red cells, drift to the margins of the stream and are caught in this network of platelets and fibrin and the process is repeated until the entire stream is blocked. The portion of blood between the obstruction and the next main channel then solidifies as a clot. This long clot when dislodged within the circulation may go to any part of the body and will find its embolic rest in accordance with its size.

A thrombus which is visible or palpable is usually of smaller caliber than one which is latent. Embolism from a manifest thrombus must be repeated to be fatal, while embolism from the latent thrombus is the fatal acute obstructive pulmonary embolism. The former is not subject to surgical removal; the latter has been removed nineteen times, with seven successes.

Waltman Walters has recommended thyroid substance together with early active movement as a preventive of thrombus formation. Essen-Moller used these methods in 300 surgical cases, with 300 controls, but notices no difference in ratio between the two series. Lately Rankin has reported that their observations at Rochester have likewise shown no lowering in percentage of thrombus formation since the institution of these methods.

Aschoff considers the variation in blood flow as the most important of the causative factors. Since spinal anesthesia has a faculty for temporarily lowering the arterial tension, it naturally follows that there might be some tendency on the part of this form of anesthesia to favor thrombus formation. Reports of this sort are not sufficiently frequent or numerous to know if there is an increase of this disease in cases where spinal anesthesia is used. There is probably no increase, since the disease is observed in all varieties of cases and under all types of treatment, and following the administration of all anesthetics.

A case occurred in my practice recently in which, for a pelvic repair, two injections of novocain were given into the spinal canal: the first of 150 mgm. novocain, for the perineal work; the second of 200 mgm. for the abdominal repair. These large doses were used because the patient was heavy. The operation was performed upon a Saturday; the patient died the following Wednesday from acute obstructive pulmonary embolism. The diagnosis of latent thrombus was evident from the fever, restlessness and gastric distress of the patient, combined with the sign described by Mahler, in which the pulse is more rapid than the temperature and respiration warrant. Death occurred in the presence of all members of the patient's family within fifteen minutes of the embolism.

Postoperative hemorrhage may occur in the presence of icterus, hemophilia, toxemias of various sorts. The mechanism which is attributed to spinal anesthesia is that the fall of pressure permits a vessel to be incised without exhibiting any large flow of blood. The failure to clamp and ligate this vessel which naturally follows, leads to oozing from that vessel when later the blood pressure increases. Rankin especially has emphasized this complication. Whether he has experienced this frequently or not I do not know, but Rankin is a strong exponent for spinal anesthesia. In my own practice I have observed postoperative hemorrhages apparently of this origin. The painful fact concerning postoperative hemorrhage is that if the bleeding is not stopped, death is certain. Unfortunately postoperative loss of blood often occurs in individuals who have been subject to severe surgical procedures and the manipulation necessary to stop bleeding may produce enough additional shock to end the patient's life. There can be no demonstration of surgical judgment in such a case, however, as the choice lies between a 100 per cent mortality and the possibility of life. Fortunately the loss of blood produced by this particular cause of postoperative hemorrhage is slow.

Sudden death is a condition I have not encountered. It must be a terribly shocking experience. The true facts concerning this tragedy are not definitely known. One may theorize about it, however. There may be the nerve shock of the lumbar puncture, the pressure of the brain into the spinal canal with compression of the medullary centers. There may be injection of novocain into the blood stream with its attendant reaction or one can visualize the possible spread of the anesthetic solution to the respiratory centers, though this possibility has never been clearly demonstrated. Also there remains the occasional drug idiosyncrasy which may explain sudden death. One wonders if W. W. Babcock has ever encountered this complication. With his vast experience with spinal anesthesia, it may be that some of his deaths or threatened deaths could fall under this classification, but you remember he says that if you cannot have an operating room force which is so equipped as to get fluid into the patient's veins within 20 seconds of the start of that patient's reaction, you should not use spinal anesthesia. In a recent

collapse on the table which one of my patient's suffered (under gas anesthesia) it was five minutes before the needle conducting the fluid could be introduced into the vein. By that time, the blood clotted in the veins, no matter where the attempt was made for venoclysis. We were forced to depend upon a combination of stimulants—adrenalin, caffein, sodium benzoate, pituitrin, ephedrine, camphor, and coramine—combined with the head lowered posture, and fluid by rectum. Though the patient survived this reaction, the strain of the imminent death was terrific. If Babcock can secure intravenous fluid in 20 seconds this may explain the absence of sudden deaths in his last 18,000 to 20,000 cases. It may be strongly recommended that all hospitals adopt this method of dealing with emergency complications in the operating room.

Thrombo-embolic disease, postoperative hemorrhage, and sudden death are complications of infrequent nature. The consideration of the exhausted or debilitated patient, is, however, one which is less uncommon, and with which everyone is at some time forced to exercise his judgment in the selection of an anesthetic. This type of case is not a desirable risk under any form of anesthesia and should be most carefully watched under spinal anesthesia. The exhausted and debilitated patient will not tolerate even a temporary fall in blood pressure. About five weeks ago, I had a patient who presented the following record. After taking a nine hundred mile trip with one hour's sleep he presented an acute mass in the upper right abdomen, with vomiting of 24 hours' duration. He did not eat for another 24 hours' time, during which a diagnosis was established which called for a really severe surgical procedure. This was undertaken under spinal anesthesia and the operation was discontinued before completion because of the patient's bad condition. A second operation was required to finish the procedure, from which also he convalesced only after a terribly trying reaction of 24 hours' duration, and he might have had the same results under any other anesthesia than the one used. We have no controls on which to base an opinion, but one wonders sometimes if a surgical patient might be slightly more responsive under a different management, and so it is in this case. A long protracted prostatic illness and cases of hemorrhage are other types, concerning which extremely good judgment is required for the selection of the best anesthesia.

It is natural to analyze one's experiences with a newer form of procedure, and it seemed a suitable time to look through some records on unfortunate cases dealt with surgically under spinal anesthesia. The studies on thrombo-embolic disease, postoperative hemorrhage, sudden death and results of surgical procedures on exhausted and debilitated patients impress me with the fact that some judgment must be exercised in the selection of anesthesia for various patients, with the need for immediate fluid injection attendant upon emergency complications in the operating room, and with the unquestioned excellence of spinal anesthesia when these various possible contingencies are kept in mind.

DISCUSSION

Dr. R. J. Moe (Duluth) said he would like to mention another danger which they experienced, namely blood pressure of 180 or over. It had been their experience that such patients do not tolerate a decided drop in blood pressure. A drop from 200 to 120 is not tolerated as well as a drop from 120 to 60 or 70. This is accounted for by the fact that the high blood pressure has been accommodated for by the patient. Recently they had been more guarded in operating this type of patient than they had been in the past.

Dr. G. A. Williamson (St. Paul) asked how long Dr. Bessesen felt it was necessary to keep the patient in the Trendelenburg position.

Dr. C. J. Ehrenberg (Minneapolis) called attention to a report some months ago in Surgery, Gynecology and Obstetrics of some French neurologist who had been working on patients who had had spinal anesthesia. They reported a number of findings of paralysis in the lower extremities, the spinal anesthetics having been given ten or more years before. Their impression was that it was due to some injury from the anesthetic.

Dr. Bessesen stated that the length of time for the Trendelenburg position should be at least three hours, or between three and six hours, if the postoperative condition of the patient does not contra-indicate it. He thought the patient should not have a pillow the first twenty-four hours at least. Concerning nerve injury, he believed that novocain was not used so extensively nine or ten years ago but that stovain was used about that time and if he was not mistaken that had been known to produce nerve injury. He did not believe novocain has such a tendency to produce nerve injury.

Dr. Edward T. Evans (Minneapolis) read a paper on "Delayed Lesions Following Trauma of the Hip."

In 1914 Axhausen, in an article entitled "Bone Necrosis and Sequestrum Formation" stated that "mild inflammatory reactions, particularly when associated with embolic or thrombolic processes and due to low grade micro-organisms, may sometimes result in necrosis which is followed by simultaneous absorption of dead bone and incomplete, irregular replacement by new bone."

We now know that necrosis may result from a number of so-called aseptic causes, namely injuries, vascular disturbances, chemical action, and radium.

Much has been written on this subject in the past few years and Phemister of the University of Chicago has studied this problem so thoroughly that I take the liberty of calling "aseptic necrosis" of the head and neck of the femur following trauma, "Phemister's Disease."

For a clear understanding of his concept of aseptic necrosis, I would refer you to his paper read before the American Orthopedic Association in June, 1930, and published in the Journal of Bone and Joint Surgery in October of that year.

In presenting these cases I wish to stress only two points: (1) the dire necessity of appreciating fully the blood supply variables of the hip joint in the early handling of a case of hip injury, and (2) the necessity for careful supervision and follow-up in the functional restoration of the part, involving above all a knowledge of how bone heals and the influence of function upon that healing.

Quoting from Phemister's article, is the following:

"The fate of bone which undergoes aseptic necrosis as a result of circulatory disturbance varies considerably, according to the environment of the necrotic area. If the necrotic bone is attached to and directly continuous with living bone, there is ingrowth of vessels and of fibrous and osteogenic tissues from the living into the necrotic area. There is usually survival of unossified osteogenic elements about the periphery and ends of the area that has had its circulation interrupted. By the process of creeping substitution the old bone is gradually absorbed and replaced by new bone, so that in the course of months or occasionally years the necrotic area is more or less completely transformed into a living one. Whether the amount of new bone formed is as great as the amount of bone which died depends largely upon the extent of living bone with which it is in contact and the amount of osteogenic elements surviving about its periphery. When these are both extensive, there may be complete replacement of the dead bone by new bone; but when limited, bone absorption may be greatly in excess of bone formation, so that incomplete replacement results, with the formation of bone that is less dense than the original and that shows varying degrees of cavitation. Functional stimulation also plays an important role in the rate and degree of transformation. In general

the greater the degree of function the greater the rate and degree of transformation into new bone. If the necrotic bone is largely or wholly intra-articular and extensively bordered by articular cartilage, the attachment to the surrounding soft parts will be markedly limited and chances for revascularization and transformation will be greatly reduced."

In fractured neck of the femur, "If bony union occurs, the head is gradually invaded by the ingrowth of tissue from the distal fragment and sometimes from the hypertrophied round ligament. The necrotic marrow is replaced by vascular connective tissue and eventually by bone marrow, but the necrotic bone is much more slowly absorbed and replaced by a variable amount of irregularly arranged living bone. The necrotic cartilage is slowly absorbed and replaced by fibrous tissue, fibrocartilage, and to some extent eventually by new hyaline cartilage. If too much weight is borne on the head before it has been transformed into new bone, its weight-bearing portion may collapse with a resultant deformity and poor functional result, but this may be averted by prolonged avoidance of weight-bearing. The functional stimulation which comes from motion of the limb without weight-bearing is sufficient to hasten transformation of the head."

Case 1.—On October 20, 1929, this patient, then twenty-nine years of age, dislocated his left hip in an automobile accident. Reduction was successful as shown in this plate. The hip was not fractured. The patient made a normal convalescence and walked in six weeks and for approximately eight months had no discomfort.

About six months prior to my seeing him in February, 1931, he began to have pain in the left hip which gradually increased until he sought relief by applying for examination at the United States Veterans Bureau.

This X-ray shows the condition, February 14, 1931. The first X-ray was sent for and unsuspected fracture ruled out. The patient was placed in a plaster spica with bed rest for eight weeks with complete relief of pain. This was followed by weight bearing in the spica for a time and then the caliper brace, which he still wears when ambulatory.

The X-rays of May, July and October, show the gradual restoration of bone under protected functional use. There is no pain, the patient is happy and though he may later require arthroplasty for mechanical reasons, it is believed there will then be good bone to utilize for the reconstruction of his hip.

Case 2.—These X-rays are those of a woman of fifty-four who sustained an intracapsular fracture of the neck of the femur in June, 1928. It was beautifully reduced by a very competent man, the recovery was rapid, and she returned to her home to carry on an active social life, including dancing and a prolonged European trip.

The convalescence was considered complete until last December when pain developed.

The X-rays show the progressive late necrosis occurring (December, May, September).

The patient is doomed to one of two courses: (1) prolonged protection from weight bearing combined with functional use as allowed in a caliper brace (this, she refuses); (2) surgical reconstruction.

DR. MYRON O. HENRY (Minneapolis) read a paper on "Osteosynthesis in Intracapsular Fracture of the Hip of the Dog."

In this work, fifteen experiments were performed upon the right hips of adult dogs of unknown age. After careful preparation of the skin and etherization, the right hip was exposed by a muscle splitting incision, severing only the tendon of the quadratus femoris muscle. The ligamentum teres was severed in order to dislocate the hip. An intracapsular osteotomy was then performed.

Round nails made of rustless steel were used to peg on the free head from the proximal side, after the method of Hey Groves, in four experiments. These nails failed to hold in every case without external immobilization and the round nail was therefore discarded as a means of internal fixation.

A highly polished, rustless steel screw was then devised by the author, having coarse double-pitched threads and a slot at both ends. Such a screw was introduced through a drill hole the size of its core, made through the head and neck of the femur, entering at the fovea capitis and passing along the axis of the neck to bite well into or through the cortex on the lateral side of the trochanter.

Four animals were immobilized in plaster of Paris spica casts after such an osteosynthesis had been performed. All four died, three of pneumonia, and one presumably from distemper.

The modern trend seems to be away from prolonged immobilization in the treatment of fractures near joints. Early active motion is thought to stimulate healing by maintaining normal circulation and preventing atrophy of disuse.

In seven successful experiments, no external fixation was used, and the animals were usually found getting about with stable hips a few days after operation. A dog, having four legs, will not use a painful or unstable extremity at all. Motion pictures were made to record the stability and degree of function in the seven successful experiments.

Conclusions.—Hey Groves method of proximal osteosynthesis was performed in fifteen experiments on dogs whose epiphyseal lines were no longer discernible on X-ray.

Round nails were found inadequate for fixation of intracapsular fractures of the hip without external immobilization.

All animals immobilized in plaster of Paris spica casts died.

A rustless steel screw of special pattern secured satisfactory apposition of the fragments of intracapsular osteotomy of the neck of the femur and maintained adequate fixation of the fragments without external immobilization.

Such a screw is practically inert in bone.

Complete bony union with revivification of the head occurred within forty-nine days in the animals sacrificed for microscopic study.

The capital fragment, devoid of all soft parts, in intracapsular osteotomy of the neck of the femur of the dog, readily unites and revivifies under the proper physiological conditions essential to the healing process in bone.

Early, continuous, and accurate contact, with absolute fixation of the fractured surfaces, is of paramount importance in the healing of fractures in the presence of synovial fluid.

DISCUSSION

DR. BESSESEN asked if the screw penetrated the trochanter what would be the results of leaving the screw in place?

DR. HENRY said that that was the intention, that he had tried to have the screw project through but only in the white dog did it show. He had decided, if he felt justified in doing this on the human, that he would have the screw much longer. There would be no need to remove it, as it was rustless steel and produced no reaction. He thought it would be all right to leave it in place.

DR. WILLIAMSON asked if there was any absorption of the head.

DR. HENRY said no, not in the successful cases of this series. The head was chiseled off smoothly and he thought a fractured hip would be easier to do, because the edges of the fracture line were irregular.

DR. BESSESEN asked if there was any necrosis of the head, free of soft parts.

DR. HENRY stated that these heads were necrotic bone, temporarily, which revivified. He had microscopic slides

showing the head and neck forty-nine days after operation showing no evidence of the line of osteotomy. He said if there is sepsis the head dies. He felt that more experimental work probably should be done along this line before the procedure could be tried on the human.

Dr. C. J. Ehrenberg (Minneapolis) read a paper on "The Use of the Cautery in the Treatment of Diseases of the Cervix."

Casual inquiries at a number of private hospitals, and the University of Minnesota Hospital reveals that a considerable number of operations are being done on the cervix uteri under the diagnosis of cervicitis, endocervicitis, erosion, laceration of the cervix, and infection of the cervix. While the writer has no wish to recommend the exclusion of surgery in the treatment of these conditions, recent gynecological literature tends to show that the subject of surgery versus cauterization and its allied therapeutic agencies is gradually becoming less controversial, and that more and more the tendency is towards cauterization. So that the recommendation of this last named therapeutic agent is justified.

The high incidence of disease of the cervix uteri is obvious to one who practises among women. And, while time limitations preclude an extensive discourse, a brief mention of those conditions underlying most cervical pathology is necessary to evaluate the benefits of the recommended treatment.

The cervix uteri is an organ having structural, functional, and locational peculiarities, which predispose it to infections both acute and chronic. Acute infections are usually of two kinds, those secondary to parturition and those due to gonorrhea. These are treated as acute infections in any other location, namely supporting treatment to the natural processes of healing. The structure of the cervix, however, is such that acute infection usually terminates in a chronic condition which demands some type of further treatment for cure.

The results of chronic infection of the cervix uteri are classified into two groups: those having constitutional relationships, and those having local relationships. It is now an accepted fact that chronic cervicitis is a focus of infection along with the other common sites of focal infection. And the writer has reason to believe, from numerous observations, that an interrelationship exists between infected cervices and other foci of infection; the existence of one being dependent on the existence of the other. Any constitutional illness demanding elimination of foci of infection must include the removal of any infectious process from the cervix.

The local symptoms arising from the chronic infected cervix uteri are many; leukorrhea, back pain, and lower abdominal pain are those most common, the latter being often a consideration in the differential diagnosis of abdominal disease. Another of the sequelæ of cervical disease is sterility, this commonly being stated as the greatest single cause of the secondary type of this condition.

The foregoing presupposes that infection is the essential factor in the pathology of the cervix. And, excluding new growths, such is the case. Treatment then must satisfy a number of requirements: (1) the thorough elimination of the focus; (2) a result which does not interfere seriously with any further functional demands of the organ. Secondary factors essential for consideration are: (1) the ease with which the treatment can be applied according to the facilities at hand and the necessary dexterity of the operator; (2) the economic aspects such as the length of the period of disability, the hospital fee, and the physician's fees.

Until recently, the accepted form of treatment has been of two kinds. The first or medical, consists of topical application of some type of astringent or antiseptic solution, or both, in conjunction with a hydragogue tampon. This treatment ordinarily violates only the first of the above stated requirements. While it may suffice in some cases to ameliorate the condition and to cure in a few mild cases, it generally does not eliminate the infection thoroughly. The second kind of treatment, namely, the surgical, was evolved through the failure of the first. Numerous operations were designed to remove the gland-bearing area of the cervix which was sufficiently deep-seated so as to be impervious to local applications. This treatment usually violates the second of the requirements, namely function, and further requires all of the facilities for a major surgical procedure, a trained surgeon, and a period of confinement, which, to say the least, is uneconomical.

Cauterization of the cervix uteri, though popularized in the last few years, and though still in the period of exploration, is not entirely new. Dr. Robert Dickenson has used the method for about twenty-five years. Without tracing the historical progress, the perfection and development of electrical equipment, along with the exploitation by commercial institutions, has done much to popularize the cautery and the electrode knife.

The writer, having had little experience with the electrode knife and having derived much satisfaction from the use of the cautery, wishes to outline the simple technic. The time of the cauterization in relationship to the menstrual cycle is of some importance; the period for cauterization being confined to the days intervening between the fourth day post-menstruation and the tenth day preceding the expected menstrual period. Pregnancy is a definite contra-indication to cauterization although in a number of cases of cauterization of the cervix as a treatment for sterility, the second cauterization was done without apparent disturbance at a time post-dating the subsequent pregnancy. Acute cervical inflammation and any type of acute pelvic inflammation contra-indicates cauterization the same as surgery.

The procedure can usually be done in the office without the use of a general anesthetic. Where the lesion is widespread or in cases of previous surgical measures a light general anesthetic may be given. The patient is put in the dorsal position with the thighs well abducted. The cervix is well exposed through the Graves speculum, a tenaculum forceps or a hood being used if necessary. The vagina and cervical canal are cleansed and an anesthetic solution is applied to these regions. A number of cauterization speculi have been devised, but a second Graves speculum (Peterson's modification) inserted transversely is very satisfactory. The speculi serve to insulate the vaginal walls from the heat. The patients are warned about the sound and odor of the procedure. Cauterization is then done, care being taken to withdraw the cautery frequently, so that the radiated heat on the vaginal walls will not become too intense. Apprehensive patients may complain of some pain on applying the cautery to the cervix. Experience, and various types of lesion, such as laceration, eversion, erosion, and cystic conditions guide the operator in determining the area to be cauterized. Two models of the Post cautery are used, one the knife blade tip and the other the large blunt tip, the employment of one or the other being dependent on the type of lesion. Occasionally the external os is dilated previous to the use of the cautery for a lesion in the cervical canal.

Only occasionally is there an immediate reaction to this procedure and then only of a psychic nature, as fainting. Also occasionally the patient will complain of some lower abdominal discomfort for the remainder of the day.

Following cauterization, a leukorrhea, often of a profuse nature, appears and remains from ten to fourteen days. This is easily controlled by douches once or twice daily. From the seventh to the ninth day following the treatment there may be some vaginal bleeding which is due to the separation of the slough. On a number of occasions the menstrual period following the treatment has been complicated by a severe

menorrhagia, but, since the avoidance of cauterization during the ten days preceding menstruation, this complication has not arisen.

Complete healing does not take place until about six weeks after the treatment.

Often the application of a single treatment does not suffice and it must be repeated once, twice, or even three times before the desired result is obtained, although invariably symptoms are much diminished following the first treatment.

The writer's confidence in cauterization is so complete that no operative procedure has been attempted for some years. As mentioned before, there have been a few occasions when cauterization has relieved what previous surgery did not. Cauterization is used commonly postpartum on the minimal lesions so often seen, but never before six weeks have passed. A number of patients cured of a cervicitis following one pregnancy have passed through a second and third pregnancy without further demonstrable pathology of the cervix.

DISCUSSION

DR. BESSESEN asked if the treatment is used in pregnancy, and, if so, are there any changes in the technic.

DR. EHRENBERG stated that in pregnancy he felt that it was contra-indicated, although one case when he had cauterized the second time it was very apparently very early in pregnancy.

DR. J. J. SWENDSON (St. Paul) asked if the procedure is known as coagulation or carbonization.

DR. EHRENBERG replied that the process is one of carbonization.

DR. SWENDSON said that he had been greatly interested in this work and wished to call attention to the danger of stenosis occasionally following cauterization of the cervix. He had seen cases with a resulting pyoendocervicitis causing focal symptoms which subside when the cervical canal was dilated and drainage established. He called attention to differences of opinion held as to the preferable method of cauterization, stating that Dr. Heaney of Chicago had abandoned linear cauterization because of resulting hemorrhage at times, and was doing flat cauterization in all cases. He also noted that there was recent mention in the literature of the benefit following cauterization of infected cervices during pregnancy and stated that no complications of the procedure had been observed.

DR. EHRENBERG said that, with the lesion limited almost entirely to the cervical os, such as laceration and eversion, one is not apt to burn the external os and get contractions. For this reason, Dr. Dick recommends the platinum wire cautery as this can be put inside the cervical canal and the cauterization done there. Dr. Ehrenberg said he took a Hegar dilator and dilated the external os before inserting the Post cautery inside the cervix. There is some evidence that cauterization of the cervix may produce an endometrial change. He had the experience of having a menorrhagia following cauterization of a cervix. For this reason cautery is not done during pregnancy as he would not care to take the chance of producing a miscarriage. Even if the miscarriage were not due to the cauterization, one would likely be blamed. Also, the cervix, during pregnancy, is subject to considerable variation of size and shape, and one would get a better idea of the normal if cauterization is not done during pregnancy.

DR. LEO G. RIGLER (Minneapolis) gave a lantern slide talk on "Benign Tumors of the Stomach."

ABSTRACT

The benign tumors of the stomach are far more common than has previously been supposed, comprising, in the author's experience, about ten per cent of all gastric neoplasms observed. The polypi are the most common variety. Clinical diagnosis is difficult and in many cases impossible.

Roentgen examination when carefully done will reveal these lesions in almost all cases. The technic is of great importance, the use of pressure and only a small amount of the barium mixture being the essential features. The presence of a sharply outlined, round, filling defect which is central in position, somewhat movable, and shows normal peristalsis and flexibility of the gastric walls about it, is diagnostic of a benign tumor.

Those polypi which are located in the antrum of the stomach and are pedunculated may prolapse through the pylorus into the duodenum. Acute pyloric obstruction may thus occur with striking symptoms which may be completely relieved spontaneously only to occur again at a later date. In these cases the defect may appear to be in the duodenal bulb. In one case the author was able to demonstrate by manipulation under the fluorescent screen this prolapse of a papilloma through the pylorus.

Occasionally a benign tumor may slough off producing severe hemorrhage, symptoms of acute ulceration, or other findings. No scar whatever may be left on the mucosa. In such a case the X-ray findings may not be substantiated at operation due to no fault of the examination. The author has seen two such cases in one of which the sloughed fragments of the tumor were found in the stomach without any evidence in the mucosa to indicate their origin. Not infrequently the polypoid type of tumor may not be palpable even after the abdomen is opened and it is necessary to open the stomach before they can be excluded.

Benign tumors, especially the adenomata, adenomyomata, papillomata, and fibromyomata, are frequently multiple and they may produce a sponge-like appearance in the gastriic roentgenogram—gastric polyposis. A similar appearance may be produced by a markedly hypertrophied or swollen mucous membrane without any real neoplastic tissue being present.

Recurrence of the tumors may take place after operation, although it is not common.

Malignant degeneration of these benign lesions is not uncommon and forms one of the indications for operation. It is possible that ten per cent of all gastric carcinomata arise in this way. In one case the roentgen examination revealed the typical picture of multiple benign polypi of the stomach. Nine months later, on the second examination, definite infiltration of the greater curvature with loss of peristalsis could be made out. At autopsy, benign and malignant tumors were found side by side.

Occasionally benign and malignant tumors may be demonstrated in the stomach at the same time, the two having no apparent connection.

Surgical removal of these benign neoplasms is indicated both to relieve symptoms and to prevent their degeneration into carcinoma.

DISCUSSION

DR. J. F. NOBLE (St. Paul) stated that, for the purpose of general discussion, benign tumors of the stomach may be classified as adenomyomata, leiomyomata, and papillomata or polypi as they are generally called. Fibromata have been reported as occurring in the stomach but careful study has usually proven these tumors to be myomata. Lipomata have also been found in the stomach.

From a clinical standpoint, the adenomyomata are of relatively little importance. They are generally considered to be congenital in origin and arise from misplaced gastric or intestinal glands located in the muscle layer of the stomach. Their structure and origin are very similar to pancreatic and adrenal rests, which are also occasionally seen in the stomach wall. These tumors are, as a rule, accidental autopsy findings and are usually small.

Leiomyomata are also generally considered to be rather rare in the stomach but some recent work by

Rieniets, a Fellow in Surgery at the Mayo Clinic, has clearly shown them to be the commonest benign tumor of the stomach. Dr. Rieniets has kindly allowed the author to read his thesis, which is as yet unpublished, and to use some of his material in this discussion. In a study of 200 autopsy cases he found forty-three leiomyomata in thirty-two of the stomachs or in 16 per cent of the cases. Most of these tumors were small and of no clinical importance but his figures definitely show a surprising frequency for this type of tumor. Exclusive of this group he also studied all of the autopsy records at the Mayo Clinic for a six-year period and discovered only thirty-four tumors described, pointing to the fact that many of these tumors are overlooked in routine autopsies. He also included in his work twenty-one leiomyomata which had been removed surgically. From this series of cases he has brought out much interesting data.

He shows that the tumors may occur at any age, though they are much more commonly seen in older individuals. They are more common in males than in females. The tumors found at autopsy were commonly seen at the cardiac end of the stomach and those surgically removed were for the most part near the pylorus and at least four of them caused definite obstruction. These tumors may arise from either or both muscle layers of the stomach and may be intramural or pedunculated, the pedicles being attached either to the serosa or mucosa of the stomach. None of his tumors showed evidence of malignancy. Hausmann and others, however, have reported definite malignant smooth muscle tumors of the stomach. Rieniets also points out that these tumors may cause intussusception, mucosal ulceration and even perforations.

Next to leiomyomata, papillomata or polypi are the most common benign tumors of the stomach. They are of much more clinical interest because they are readily diagnosed by X-ray, as Dr. Rigler has shown, and because they are known to undergo malignant change. They are not uncommonly found accidentally at autopsy, either as single tumors or much more rarely as multiple tumors covering the greater portion of the gastric mucosa. Ewing describes this condition as gastritis polyposa. Multiple polyposus, however, is much more commonly seen in the large intestine. The tumors are pedunculated or sessile. They are papillomatous in structure, covered with fairly normal gastric mucosa and are supported by a connective tissue core carrying the blood vessels. Torsion followed by gangrene and complete disappearance of the tumors has been described by many writers and the writer believes that Dr. Rigler's case is best explained in this way. These tumors, because of their papillary structure, are also very prone to ulcerate and occasionally this ulcer causes severe hemorrhage as seen in another of Dr. Rigler's cases. From a clinical standpoint, however, the relationship of these tumors to gastric malignancy is their most important feature. From the work of Verse and others we can say quite definitely that most gastric carcinomas do not arise from polypi but rather from localized foci of malignant degeneration in previously normal gastric glands but occasionally they are responsible for clinical carcinomata of the stomach. Dr. Bell has observed two of these cases and other workers have followed these changes. It is common knowledge that malignancy frequently follows polypi of the rectum, bladder and other mucous surfaces. It would seem to be a good general rule to consider all papillomatous growths of mucous surfaces as potentially malignant tumors and to treat them accordingly.

Dr. Harold Leland (Minneapolis) read a paper on "Ascheim-Zondek Reaction."

Laboratory tests for pregnancy are at least 3,000 years old as evidenced from an Egyptian papyrus reading: "A woman may determine if she is pregnant by taking some earth and barley in a vessel and adding to it day by day a little of her urine. Should the barley grow, then she is pregnant, but if the grain does not grow, then she will not bear a child."

In 1928 two German investigators, Ascheim and Zondek, in the Klinische Wochenschrift, reported a more reliable and accurate test for pregnancy which bears their names. The principle was derived from the fact that when 10 mgms. of hypophysis were implanted into the muscle of the thigh of an infantile mouse, the animal went into estrus after four days. Normally a mouse weighing 12 gms. goes into estrus in the sixth weeks. The above experiment was done on mice three weeks old weighing about 6 grams. The estrual changes in the vaginal mucosa are not directly caused by the hypophyseal hormone given off from the implanted material, but indirectly by way of the ovary. The hypophyseal substance makes the infantile ovary mature, and this leads in turn to the changes in the vaginal epithelium.

Ascheim and Zondek in hundreds of experiments and thousands of serial sections have shown that there are three chief morphologic changes produced in the infantile ovary under influence of the hypophyseal hormone. The ovary of the immature mouse contains only primordial follicles and small graafian follicles without cavities. The first change caused is growth of the follicles, leading to rupture and discharge of ova into the tubes. Second, there occur hemorrhages in many of the enlarged follicles which are visible to the naked eye as cyanotic dots. Finally atretic corpora lutea are formed in the ovary by luteinization of the follicles which have not fully matured. The substance, which, in the implantation experiment makes the changes in the ovary, is present during pregnancy, as Ascheim has found, in the decidua, in the corpus luteum, in the placenta, in the amniotic fluid, in the young embryo, in the blood serum in large quantities and, most important, in the urine of the pregnant woman. This excretion of the hypophyseal hormone in the urine of the pregnant woman forms the basis of the Ascheim-Zondek test.

Technic: The first specimen in the morning is the best for use. Five mice are used each weighing from 6 to 7 grams. The injections are given with a tuberculin or insulin syringe into the back of the animal. Three injections are given the first day consisting of 0.2 c.c. for the first mouse, 0.25 c.c. for the second, 0.3 c.c. for the third and fourth and 0.4 c.c. for the fifth. Three similar injections are given the second day. One hundred hours later the animals are killed and the ovaries examined. When the test is positive, the ovaries are two to three times the normal size (which is the size of a pin head) and are red, presenting cyanotic protrusions due to hemorrhage into a follicle or a corpus luteum. If there is doubt about the ovaries, serial sections are made by fixing in Zenkers and embedding in paraffin. The microscopic finding of even one single corpus luteum renders the test positive.

But great difficulty exists in maintaining a colony of white mice 21 days old and weighing six to seven grams. So Friedman modified the above technic using young rabbits weighing not less than four pounds which had been carefully isolated in separate cages. It is known that the rabbit, although its ova continuously ripen, does not ovulate until after copulation. Thus it is possible to study the effect of the urine on ovaries free from corpora lutea and corpora hemorrhagica. From 7 to 15 c.c. of urine, usually 10 c.c., are injected into the marginal vein of the rabbit's ear. Thirty hours later the animals are examined. Positive tests are indicated by the presence of corpora lutea and corpora hemorrhagica, which are detected by gross inspection.

Results.—In 1,000 cases Ascheim and Zondek found the test positive in 98.6 per cent. In 470 controls they found no errors, and the cases of amenorrhea constituted the most important group. None of the 126 cases of amenorrhea gave a positive test. In one other test the physician had diagnosed pregnancy because of

a missed period; the test was positive, but after a while the patient had some bleeding which probably was an early abortion. The reaction becomes negative about eight days after delivery but has been found positive on the ninth and on the twelfth day after abortion. It remains positive as long as living placental tissue is in biologic contact with maternal blood. Thus in tubal pregnancy one can expect a positive result only when the embryo is alive and not later than eight to ten days after its death. The results of 30 cases of tubal gestation were in conformity with the clinical and operative findings. The weakness of most tests for pregnancy is that other investigators do not obtain the same results, but the Ascheim-Zondek test has been used in 2,000 cases in the Frankfurt Clinic with 98 per cent accuracy, in Scheafer's Clinic at Charlottenburg in 100 cases with 98 per cent accuracy, in the Woman's Hospital of New York in 50 cases with one error. Using the Friedman modification, Reinhart and Scott reported results in 50 cases in which 49 were positive; Schneider reported 100 cases, 50 which were pregnant and 50 which were not. The results were exact in every case. Magath and Randall at the Mayo Clinic report 85 cases using the Friedman technic. Thirty-eight were pregnant and forty-seven were not. Their results also were exact in every case. In a personal series of sixteen cases, using the rabbit in four and mice in twelve, the results were all positive as checked by later clinical results. The rabbit is much the easier animal to obtain and use for laboratory purposes and most of the recent reports are with the rabbit as the test animal. Considerable work is being done using the male rat and Dr. Adair in Chicago reports excellent results with its use. The reaction consists of hypertrophy of the interstitial tissues of the testicle and of the seminal vesicles and the prostate.

Conclusions.—1. Pregnant women excrete large amounts of hypophyseal hormone in the urine.

2. Injections of urine from pregnant women into infantile mice leads to formation of corpora lutea and to hemorrhages in the ovary.

3. This reaction, the Ascheim-Zondek, is positive in 98 per cent of cases.

4. In tubal gestation and in abortion, the test is positive as long as living fetal tissue is in biologic contact with the maternal blood.

5. This test is also strongly positive in hydatiform mole and in chorionepithelioma, and in the latter is most valuable in determining treatment.

6. The writer makes a very earnest plea for the establishment of central stations where urines from pregnant women might be sent and the work done for a nominal fee, as is done in the British Isles, notably Scotland. The difficulties of obtaining laboratory animals and of technic are too great for the busy practitioner to cope with.

7. The test is a brilliant contribution to the field of diagnosis.

DISCUSSION

Dr. D. H. Bessesen said he happened to know that Dr. Leland had done all this work himself, and he felt the doctor should be complimented on the work. The analysis is these mice requires expert opinion but the rabbit is easier to work on. He felt it was splendid to have this laboratory procedure.

Dr. R. J. Moe (Duluth) stated that he had done twenty-five of these tests and he wished to call attention to the fact that there might be factors which would modify it. For instance, if one were testing a urine in which he might suspect the possibility of the presence of quinin, it is important to extract the quinin with ether. He had had one such case and so divided the urine into two parts and got a markedly positive reaction from the one without quinin in it and a negative reaction from the one with the quinin. There might be other things in urine, as acetone, which would modify the results of the test.

Dr. Leland replied that Dr. Moe's point is well taken. Zondek had the idea of a detoxifying agent, which is two to four times the amount of ether shaken with the urine. This reduced the mortality from 20 per cent in test animals to practically nil.

Dr. O. J. Campbell (Minneapolis) read a paper on "The Relation Between Cystic Disease and Cancer of the Breast."

The controversy over the relationship between cystic disease and cancer of the breast began with Billroth in 1880, when he wrote "Cancer does not originate in an otherwise normal breast." It has continued, so that even today opinion is for the most part divided into two groups.

One holds that cystic disease is definitely a pre-cancerous lesion and that the breast containing such a process should be removed to protect the patient against future cancer. The other group maintains that a breast in which cystic disease is present is no more likely to develop cancer than one which is entirely normal and, were it possible to diagnose the condition clinically, operation would not be necessary.

Two main lines of investigation have been followed by those who have contributed to these impressions: (1) microscopic study only, and (2) clinical follow-up of cases in which simple excision of part or all of the disease process has been done with preservation of the breast. Those following the first line almost always subscribe to the opinion that cystic disease is precancerous. Those following the second conclude that with certain exceptions cystic disease is not liable to malignant change.

Bloodgood followed 128 cases from which cystic disease had been excised or biopsied and found only three which developed cancer. Out of 107 such cases, Johnson found two cancers. In 1925, the writer followed cases operated at the University Hospital, in none of which had cancer subsequently developed. Since the incidence of carcinoma in these series was no greater than in normal breasts (about 2 per cent) the conclusion is almost inescapable that cystic disease is not a pre-cancerous lesion.

Representing the other school of thought are such men as Ewing, Cheatle, McCarty, and Fitzwilliams, as well as older writers such as Brodie, Brissaud, Schimelbusch and others. Encountering in some forms of cystic disease a proliferation of atypical cells, mitotic figures, and even limited invasion, they interpret these as definite evidence of a malignant tendency on the part of the entire process and urge the removal of the breasts. Ewing finds pronounced pre-cancerous change in 50 per cent of cases of cystic disease examined by him.

Most of the confusion is caused by certain forms of the disease in which very marked epithelial proliferation has occurred. The best examples of this are the solid duct adenomas of Bloodgood, or the non-desquamative hyperplasia of Cheatle, intracystic papillomas and non-encapsulated cystadenomas.

These are the borderline cases over which pathologists disagree. Here the immediate question is not so much whether a precancerous condition exists but whether it is actually malignant at the time of the examination. That such lesions may give rise to malignancy is admitted by Bloodgood, who found that carcinoma developed in about ten per cent of papillomatous cysts and in even a higher percentage of non-encapsulated cystadenomas. Kilgore found carcinoma in four out of nine cases of non-encapsulated cystadenomas.

Where the diagnosis of cancer can be easily made in microscopic section it is interesting to note that the condition differs in no material way from other forms of carcinoma; that is, the clinical signs of malignancy are present and the axillary nodes are involved in a high percentage of cases by the time operation is performed.

On the other hand when the diagnosis is subject to

disagreement it is noted that with rare exceptions the axillary nodes are free and recurrences do not follow, thus indicating that the lesions were either benign or at least of very low malignancy.

The surgeon placing the safety of his patient above all other considerations will be forced to do the complete operation on all doubtful lesions. Fortunately this group is small.

The evidence is strongly in favor of the view that except for the previously mentioned types in which epithelial hyperplasia so strongly dominates the picture, cystic disease is not a precancerous lesion.

Therefore, having established the diagnosis by exploration of the breast, the only danger encountered by the patient when the breast is preserved is that carcinoma, arising in a breast already the site of masses or nodules, may escape detection at its earliest and most favorable period. It would, however, be recognized when the clinical signs of malignancy are present. A rather remote danger is that, even removing the most suspicious area of a breast, an early carcinoma present in some other portion may be missed. These small compromises with safety seem justified in order to avoid the unnecessary removal of a large number of breasts. Where exploration reveals multiple intracystic papillomas or diffuse non-encapsulated cystadenomas, it may be wiser to remove the entire disease process even though it includes simple amputation of the breast.

DR. A. A. ZIEROLD (Minneapolis) read a paper on "Acute Cholecystitis" (to be published in full later).

ABSTRACT

Review of the literature discloses wide variance of the treatment of acute cholecystitis. This is chiefly the result of confusion of terms and absence of correlation between clinical and pathological findings. The term "acute cholecystitis" is commonly used to identify the gross appearance of the diseased gallbladder as characterized by edema, dark red hemorrhagic walls, with or without fibrinous exudate. Study of a series of sixty cases removed at operation tends to show that this condition is invariably accompanied by occlusion of the cystic duct with an impacted stone. As a result of this, obstruction of the veins and lymphatics occurs and acute edema follows. Inspection of the gallbladder wall, four to six hours after onset, reveals edema of the wall but no evidence of cellular invasion. Sections of the specimen removed twenty-four or thirty-six hours following onset show edema and round cell infiltration. This progresses to a maximum at seven to eight days, after which the process tends to recede. At the end of three or four weeks, the gallbladder returns to the condition at the time of onset, and shows no evidence of recent inflammation save some interstitial edema. At onset, the gallbladder content is sterile but as the condition progresses it may become infected and the return to normal be delayed. The term acute cholecystitis is commonly used to indicate a progressive change beginning with acute passive congestion of the gallbladder wall followed by leukocytic invasion and terminating in a return to the original state or hydrops of the gallbladder.

DISCUSSION

DR. V. S. COUNSELLER (Rochester) said these cases, which are extremely interesting ones, are difficult surgical problems from the onset. It is important to differentiate between the two types mentioned by Dr. Zierold because the dangers of perforation in the first group far exceed those of the second. Fortunately, the acute perforating gallbladder is seen less than the acute gallbladder following cystic duct obstruction. The management and course of the acute perforating gallbladder have been accurately and clearly set forth by Dr. Zierold. Dr. Counseller said he is more concerned at the moment with the acute gallbladder following stone in the cystic duct, for in many instances cholecystostomy is performed instead of cholecystectomy. He felt that cholecystectomy can always safely be done after the fever has subsided. It is his cystom to treat this group conservatively until the temperature has been normal for four or five days; cholecystectomy can then be performed safely. That cholecystectomy can be done safely is substantiated by the fact that all of these patients have an exceedingly normal convalescence. If one has diagnosed perforation of the gallbladder, it is best to establish drainage under local anesthesia with as little manipulation as possible; further treatment to be directed toward support of the patient. The principal point in Dr. Zierold's paper which Dr. Counseller wished to emphasize is that it is especially important to distinguish between the acute perforating type of gallbladder and the acute type following cystic duct obstruction because the surgical management and prognosis may be distinctly different.

DR. HAROLD LELAND (Minneapolis) read a paper on "Estimation of Disabilities for Industrial Purposes."

Recently there has been a definite step forward toward standardization of estimates of disabilities in industrial cases with several carefully planned schedules recently printed. There, of course, will probably always be differences of opinion as to the value of complete or partial loss of function of any given part of an extremity, at least until a more detailed standard is agreed upon by our Industrial Commissions. There is, however, no valid excuse for the large variations in estimates that are too frequently encountered. It is not necessary to dwell on the fallacy of pitching estimates low for purposes of effect in treated cases, or of making high estimates with the view of arriving at a compromise settlement. The purpose of this paper is therefore, not to particularly attempt to present any new schedule of rates or new methods but rather to explain certain fundamentals which might not be clear to all of us and which might guide our best judgment along uniform lines.

The Minnesota Compensation law describes a temporary disability and a permanent disability. Temporary disability refers to the time of healing following an accident and allows the man two-thirds of his weekly salary up to $20 a week, for a healing period of twenty-five weeks, after which his compensation comes out of his estimated permanent disability. The limit of such disability is 300 weeks. Occasionally where a man is partially disabled and not receiving full wages, two-thirds of the difference between his present and normal wages will be allowed.

Before going into the matter of permanent disabilities, let us consider for a moment the conditions which entitle a workman to receive temporary or permanent disability. In the first place, an accident has to occur which can plausibly account for the symptoms and disability present. On first consideration, this would seem to be simple, but remember that patients will frequently and conscientiously ascribe an illness or symptoms of a disease process to some accident or effort. Workingmen are becoming more and more educated to the fact that they have to have an accident in order to be entitled to compensation. Our most careful discretion must, therefore, be used in deriving the actual cause of an illness or disability upon which we can positively state whether or not a condition is due to disease or accident. Compensation insurance is not health insurance.

There are only certain designated occupational diseases which are compensable under the Minnesota Law. These are twenty-three in number, specifically described, and include such diseases as anthrax, lead poisoning and several similar chemical poisons; epitheliomatous cancer due to tar, pitch, etc.; glanders; compressed air illness and various conditions arising among miners, and cataract arising in glass blowers. It would be well to remember that aside from these specified diseases a

disability has to have a specific accident as a causative or aggravating factor to allow compensation.

In estimating permanent disabilities, it is necessary to understand that the Minnesota Law has placed certain valuations in weeks of compensation on specified units of extremities and estimates have to be made accordingly. For example, a leg or an arm is valued at 200 weeks of compensation or, in other words, the loss of an arm or leg would entitle the individual to 200 weeks of his regular compensation after his healing period has terminated and regardless of whether or not he is working. The next smaller unit is the hand and wrist, which is valued at 175 weeks, or the foot and ankle, which is valued at 150 weeks. The hand alone is valued at 150 weeks, and the foot alone at 125 weeks. The value of the thumb is 60 weeks, the index finger 35 weeks, the middle 30 weeks, the ring 20 weeks and the small finger 15 weeks. The value of the great toe is 30 weeks, and each of the other toes 10 weeks. In estimating disability, therefore, we have to specify the percentage of the smallest unit involved. If an index finger is involved, the disability should be made as the percentage of permanent disability in this finger. If the metacarpal-phalangeal joint is involved, or any part of the hand not including the wrist, it should be made as permanent disability of the hand not including the wrist, and so on. No provisions are made under the Minnesota Law for estimating disability on the back. It should also be remembered that estimates under the Minnesota Law are made with regard to general usefulness without any relationship to any particular occupation. The basis of disability estimates should be the same, therefore, for all types of workmen.

In keeping with the purpose of this paper, the following schedule is not used with the purpose of giving a detailed schedule of disabilities for various types of loss of function in any one joint, but rather as a general guide to which one's judgment can be applied in any one case. The simpler the method of application, the better for the average individual inasmuch as the usual disability will be based on a combination of factors that in themselves might be complicated and confusing. The following schedule, therefore, is based on the loss of joint movements, so that we have an average normal value of any one joint. It is then comparatively simple to arrive at an approximate estimate by comparing the movement lost with the normal arc, the value of which we have established. The matter of ankylosis in a joint can be obtained fairly accurately from these figures, raising or lowering these figures according to whether the position is good or bad. The basis of comparison of normal function should be the opposite normal extremity and all angles should be accurately measured. For this purpose an ordinary carpenter's angle rule is sufficient. Also it has to be borne in mind that certain portions of the arc of motion are more valuable than others and that this might modify our estimates.

The value of the loss of joint movements is, therefore, approximately as follows. To avoid confusion, no attempt is made to give values of different types of ankylosis which are encountered comparatively infrequently.

UPPER EXTREMITIES

Shoulder movement	
Arm at side	75% of arm
From horiztontal to vertical	30% of arm
Elbow movement	
Good position otherwise	60% of arm
Pronation and Supination	
Neutral position	25% of hand and wrist
Wrist movement	
Dorsiflexion and palmar flexion, radial and ulnar deviation	35% of hand and wrist
Thumb	
Interphalangeal joint	50% of thumb
Metacarpal phalangeal joint	25% of hand
Fingers	
Proximal interphalangeal joint	60% of finger
Distal interphalangeal joint	40% of finger
Metacarpal phalangeal joint	Depends on finger and based on percentage of hand.

In testing movements of the fingers, we make it a rule if possible to hold the metacarpal phalangeal joint in a normal right angle flexion, which transmits the limitation to the interphalangeal joints and makes estimation easier.

LOWER EXTREMITIES

Hip joint movement	75% of leg
Knee joint movement	60% of leg
Ankle joint movement	35% of foot and ankle
Subastragaloid joint movement	35% of foot
Great toe, interphalangeal joint	25% of great toe

These figures frequently will have to be modified where other factors have to be taken into consideration, such as the involvement of multiple joints, associated amputations, nerve injuries, loss of strength, and the like. In the case of the lower extremities, particularly the knee, the loss of motion frequently is not as important as instability of the joint. Here, too, pain frequently has to be considered as, for example, in fractures of the os calcis. Shortening, which would play no material part in the upper extremity, would have to be considered in the lower extremity. A shortening of one inch would cause no disability; of one to two inches, 10% to 20% loss of the leg, and two to three inches, 20% to 35% loss of the leg.

Amputations have specified values according to law. The loss of one and a half phalanges or more in a finger or toe constitutes the complete loss of that finger, or toe. The amputation of the arm below the elbow constitutes the loss of the hand and wrist if enough of a stump is left to allow the use of an artificial limb. The loss of a leg so close to the hip that no artificial limb can be worn constitutes the total loss of the leg; if an artificial limb can be worn, 175 weeks is specified. Amputation below the knee with sufficient stump is valued at complete loss of the foot and ankle.

These facts are submitted with the knowledge that the figures quoted are subject to individual opinion and might justifiably be changed. Our purpose has been merely to outline a consideration of industrial disabilities which might be helpful to those who have not had the opportunity to familiarize themselves with the Minnesota Compensation Law.

The meeting adjourned.

D. G. GARDINER, M.D., *Secretary.*

McKESSON'S COPPER-IRON COMPOUND NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that McKesson's Copper-Iron Compound was presented as being of value in the treatment of anemia, with the statement that it contained copper caseinate 2.565 Gm., iron peptonate 5.700 Gm. in a menstruum of alcohol, glycerin, water and flavoring material to make 1,000 c.c. The Council examined the submitted evidence and found it insufficient to warrant recognition of a copper-iron preparation for widespread clinical use. Since McKesson and Robbins have not submitted acceptable evidence to show that its copper-iron preparation is superior to the iron preparations in current use, the Council declared it unacceptable for New and Nonofficial Remedies because of unwarranted therapeutic claims. (Jour. A. M. A., December 26, 1931, p. 1967.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

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MEDICINE

THE DETOXIFICATION OF COCAINE, PICROTOXIN AND STRYCHNINE BY SODIUM AMYTAL: E. E. Swanson (Jour. Lab. and Clin. Med., 17:325, January, 1932). The purposes of this investigation are to ascertain definitely in experimental animals (rabbits): (a) Whether or not sodium amytal detoxifies the convulsant drugs which act on the parts of the central nervous system other than the cerebrum; (b) whether or not sodium amytal affords greater protection against poisoning by intravenous than by oral administration; and (c) the efficiency of sodium amytal in preventing the occurrence of convulsions inducted by these drugs. Picrotoxin and strychnine were selected for investigation, since the former is known to cause convulsions chiefly by the stimulation of the medulla, and the latter by that of the spinal cord. Cocaine, which is known to produce convulsions by its action on the cerebrum, was also studied under the same conditions for comparison.

The study revealed that sodium amytal detoxifies each of these three poisons. The detoxifying value of sodium amytal is greater when it is administered intravenously than orally. The difference between the two routes of administration is striking with cocaine and strychnine, but relatively less so with picrotoxin. When administered subcutaneously and intramuscularly with picrotoxin and strychnine the protective action of sodium amytal is even greater by vein or mouth. Subcutaneous and intramuscular injection of the drug, however, does not detoxify cocaine.

The administration of sodium amytal increases the dose of cocaine, strychnine, and picrotoxin required to cause convulsions, and also tends to lengthen the time required for convulsions to appear following the administration of these poisons. The intravenous administration of sodium amytal, being rapid in its effect, is of greatest value in cases of cocaine poisoning, since this drug produces convulsions very soon (three minutes) after administration. The oral administration of sodium amytal gave greater convulsant protection for picrotoxin and strychnine (poisons which produce convulsions twenty minutes after administration) apparently because of more prolonged and equal rate of the development of their effects. Sodium amytal, therefore, is an anticonvulsant as well as a detoxifying agent for these three poisons.

C. A. Stewart, M.D.

PEDIATRICS

EVAPORATED MILK IN INFANT FEEDING: Charles Gilmore Kerley, M.D., New York (Arch. of Ped., Vol. XLIX, No. 1, January, 1932): For the vomiting infant, for whom the thick feeding plan is employed, the author finds evaporated milk cooked with farina gives better results than when fresh milk is used; the satisfactory results of its use in the premature gives striking proof of its adaptability in subnormal infants.

During the process of evaporation certain changes take place in the milk which make it easier of assimilation. The finer division of the fat globules and a change in structure of the protein content by means of the homogenizing process doubtless explains in part this feature.

Regardless of the nature of the change, it has been clinically demonstrated that when given in connection with orange juice it supplies the most satisfactory substitute for human milk available at the present time in the routine difficult bottle feeding case.

For those that are ill from a digestive standpoint, in cases of maltnutrition and marasmus, those who vomit habitually and those with a tendency to looseness of the bowels, evaporated milk is employed, for the reason that it requires about 50 per cent less digestive effort than does fresh cow's milk. In food value one ounce represents a trifle over two ounces of fresh cow's milk. For purposes of better assimilation in some cases the starch is cooked with a designated quantity of milk and water for one-half hour in a double boiler; milk sugar is added after the completion of the cooking. The starch used is a baked flour of either barley, wheat or oats.

In the use of evaporated milk in athreptic babies, cod liver oil in small doses and orange juice are always given provided the child can take care of them. Neither are used if they influence unfavorably the food intake, appetite, or the nature of the stools.

Evaporated milk is always used to supply the milk content in thick gruel feedings. In these cases, in addition to the vomiting, there is always a lessened digestive capacity and the author has found that the child thrives best when the evaporated product is used. In beginning its use in the marantic child, it is rarely wise to use a stronger mixture than six ounces to 24 ounces of diluent. Clinically, 12 ounces of evaporated milk appears to possess the value of 30 ounces of fresh milk.

R. N. Andrews, M.D.

FIELD TREATMENTS OF ASCARIASIS, ANCYLOSTOMIASIS, AND TRICHURIASIS WITH HEXYLRESORCINOL: P. D. Lamson, H. W. Brown, B. H. Robbins and C. B. Ward (Am. Jour. Hyg., XIII: 803-21, May, 1931). This study was prompted by the real need for a safe and effective ascaricide. After trying out the various phenol derivatives, the authors decided upon hexylresorcinol as the most effective and least toxic. The drug was administered in the crystalline form in hard gelatine capsules, a single dose of 1 gram being given orally upon a fasting stomach. The patient took the capsule upon rising and continued to fast until noon. A purge of magnesium sulphate was given after twenty-four hours. Experiments showed that hexylresorcinol in an oil solution, as caprokol, did not kill the ascarids; in water, it is only slightly soluble, very unpalatable and irritating. The authors now report the results of field treatments on 1,500 individuals.

From 90 to 100 per cent of the worms were removed by a single dose. The degree of success in the individual case was largely dependent on the coöperation of the patient. Where the experiments could be perfectly controlled and the patient was starved for eighteen to twenty-four hours, 100 per cent cures were possible, but where the children were allowed to eat shortly before the treatment, results were not so good and there was some vomiting. This was attributed to the fact that hexylresorcinol combines quite readily with protein when present in the gastro-intestinal tract. Experiments with different amounts of the drug showed that best results obtained with a dose of 1 gram for patients over twelve years, 0.6 to 0.8 gram to children from six to eight years and 0.4 gram to younger ones. A repeated dose did not produce any better results than a single one. Of those treated, 530 also had hookworms, and these were reduced by 80 to 89 per cent; when a double dose of 0.6 grams each was used, there were 88 per cent of cures. Some success in treating trichuris is also reported incidentally. The authors are still seeking a method of putting up hexylresorcinol in stable form for clinical use, since the crystals react with gelatine after a while, thus rendering the drug unstable.

L. G. Frary, M.D.

GOLD TRIBROMIDE (AURUM TRIBROMIDUM) IN THE TREATMENT OF PERTUSSIS: J. Epstein, M.D., New York (Arch. of Ped., Vol. XLIX, No. 1, January, 1932): To witness a child during an attack of whooping cough is to be convinced of the importance of some reliable drug which will alleviate the spasmodic violence. Of all the drugs used for the relief of pertussis, the bromides give better results than any of the other drugs. In observing the action of the bromides in pertussis, the author was impressed with the fact that the bivalent bromides have greater sedative effect than the univalent bromides, and it is therefore reasonable to assume that the trivalent bromides would give greater sedative action than either of the others.

Gold tribromide was used by the author in a series of cases. Treatment consisted in the administration by mouth of a solution of the tribromide. The dosage varied with the age and weight of the child and the severity of the paroxysmal cough. As a general rule 1/20 to 1/10 of a grain, three times a day, was given. In very young children, 1/30 of a grain, three times a day, was found sufficient to control the cough.

The result with gold tribromide in the 30 children was most gratifying. In two or three weeks the cough ceased entirely. In the 15 children who received the usual antipertussis remedies, the cough was frequent and racking, and the course of the disease was long, varying from three to four months.

Gold was used in medicine in remote ages. The medicinal effect of gold tribromide is probably due to a specific chemical combination of gold with bromine. The compound of gold tribromide inhibits motor and reflex irritability and causes a general sedative and antispasmodic action. For therapeutic purposes it is sufficient to know that gold tribromide shortens the period of the illness, reduces the number and severity of the paroxysms and gives the child rest and sleep.

R. N. Andrews, M.D.

ROENTGENOLOGY

TUBERCULOUS ATELECTATIC CIRRHOSIS OF THE LUNG—ITS ROENTGENOLOGIC SIGNIFICANCE: Karl Kornblum, M.D., and Richard T. Ellison, M.D. (The Amer. Jour. Roentg. and Rad. Ther., Vol. XXV, May, 1931, Pp. 620-628). In this article, the author calls attention to atelectatic cirrhosis of the lung as a lesion that may develop in the course of healing in tuberculosis.

He then reports two cases in which this lesion was the only manifestation of the disease and two other cases with the serial roentgenological findings showing the development of these lesions.

The underlying pathology is discussed. This begins with healing, the laying down of fibrous connective tissue. This tissue is deposited about the lesion and includes in it the bronchioles and bronchi. Then as healing progresses, there is a contraction of the fibrous tissue, which results in a choking of the bronchioles. This leaves an unaerated portion of the lung in the region of the lesion, and then the lung contracts and leaves a dense area, which in the roentgenological examination one finds in the lung field. If in the upper lobe, one may find the dense area and evidence that it is pulling the mediastinal contents and trachea towards it. This occurs when pleural adhesions are present. If there are no pleural adhesions present, the shifting does not occur but the space left by the contraction of the diseased area is filled in by emphysematous lung tissue. In this case, the hilus on the side affected is pulled up higher than the other hilus.

If the lesion is in the lower lobe, the diaphragm is elevated. If in the middle lobe, on the right side, there may be no change except emphysema. This condition has to be differentiated from such conditions as tumors of mediastinum, exudative and infiltrative lesions of lung parenchyma, such as unresolved pneumonia, or malignant growths, and atelectasis from complete bronchial obstruction by endobronchial lesion or foreign body. Physical examination is of little value in detecting it.

Sputum examination is commonly negative. Bronchoscopic examination may aid in the diagnosis.

Atelectatic cirrhosis is, the author thinks, more common than is realized, and may be the only evidence of tuberculosis. The disease may follow such a benign course that a history of illness is not obtained. It is always well for one to keep tuberculosis constantly in mind when making a diagnosis from X-ray films.

J. J. Rouse, M.D.

"INFRA-RED"

Under the incorrect and confusing name, "Infra-Red," the Iodine Products Co. of Caney, Kansas, describes an office test to determine the degree of acidosis. The designation, "Infra-Red," is applied to a "super-alkalized iodide." This test can do no more than determine the titratable acidity of the urine. However, this is not the method of choice in measuring the development of an acidosis. (Jour. A. M. A., January 2, 1932, p. 71.)

BOOK REVIEWS

COURTS AND DOCTORS: Lloyd Paul Stryker (formerly General Counsel for the New York State Medical Society). 236 pages, $2.00. New York: Macmillan, 1932.

This book presents in a concise and clear-cut manner the various aspects of the law as applied to medical practice. It is particularly valuable in laying down fundamental principles, both in avoiding and in defending law-suits, citing the best judicial opinion in defining the physician's rights. A particularly optimistic feature is the author's frequent proof that judges in their opinions are zealous in their efforts to help the physician so that he may practice, using his own best judgment, without fear of the intolerable bogey of unwarranted law-suits.

It is a valuable book and its reading will fortify the practitioner with clear-cut knowledge of his rights and his limitations.

C. H. MATTSON, M.D.

RESEARCH COUNCIL BULLETIN 83.—STATUTE LAW OF CORONERS AND MEDICAL EXAMINERS IN THE UNITED STATES: George H. Weinmann, LL.B. 240 pages, $3.00. Washington: National Research Council, 1931.

As the title states, this bulletin is a compendium of the Statute Law of Coroners and Medical Examiners in this country. The mode of selection, qualifications and tenure of office of the Coroner are first considered; then the matter of deputy coroners. The powers and duties of the coroner in general, and most particularly as to inquests, are taken up in detail. The statutes concerning compensation and fees are then listed, and finally the laws relative to medical examiners (in the few states in which such officials exist) are recorded and discussed. The statutes of each state and territory are listed, and leading cases are cited for the questions of law considered.

No attempt is made to suggest reforms or to give the relative value of the coroner and medical examiner systems.

It is good as a reference book, and represents much careful work.

WALTER P. GARDNER, M.D.

MEDICAL JURISPRUDENCE: Alfred W. Herzog, Ph.B., A.M., M.D. 1,051 pages. Price, $15.00. Indianapolis: Bobbs-Merrill Co., 1931.

This is a well arranged and very inclusive work, intended for the use of both lawyer and physician. I feel that the author is justified in his introductory statement that this book "will function as a guide book to medico-legal knowledge."

The chapters are divided into sections replete with references to footnotes, wherein ample and detailed references to cases are given, so that a thorough discussion of any point of law may be easily located.

A partial bibliography of pertinent medical works is appended to aid the lawyer, in securing more detailed information on medical subjects.

I feel that this is a book well worthy of a place in the libraries of lawyers and physicians.

WALTER P. GARDNER, M.D.

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